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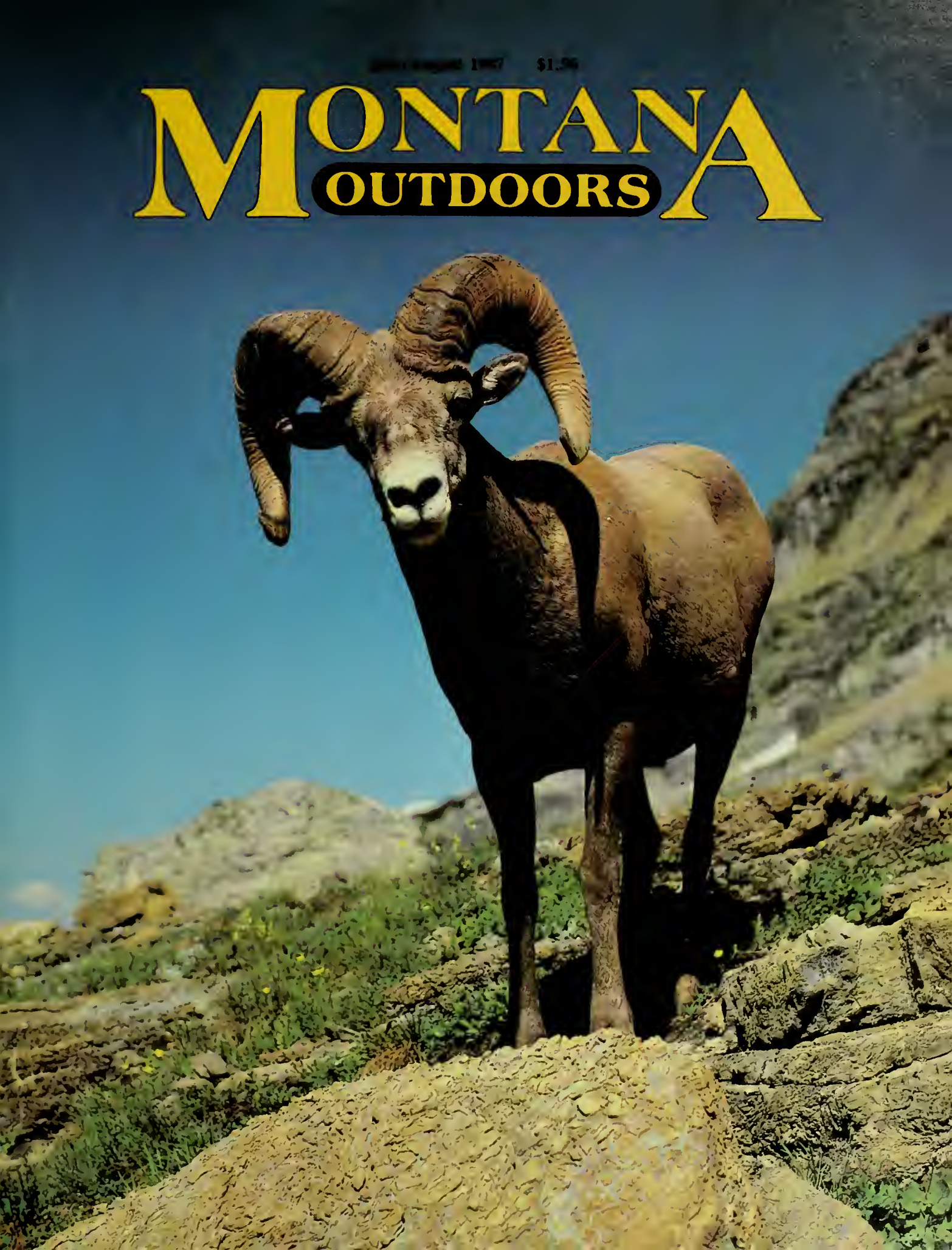
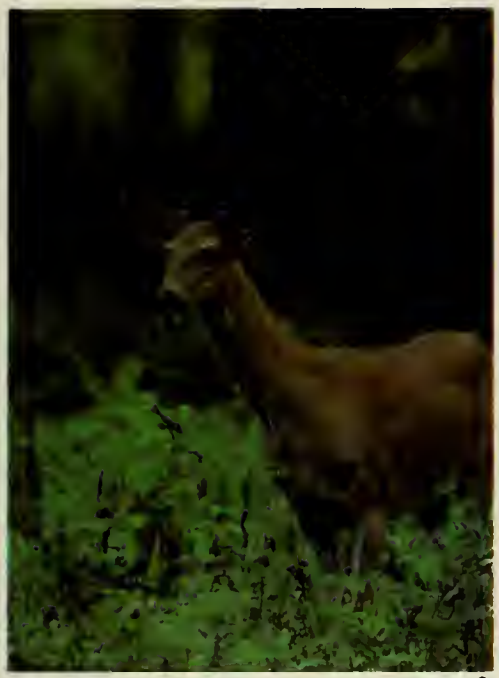
MONTANA OUTDOORS





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MONTANA OUTDOORS

July/August 1987
Volume 18, Number 4

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COVERS

Almost single-handedly, the Pittman-Robertson Act has brought about restoration of dozens of wildlife species, such as the bighorn sheep, photographed in the craggy places it prefers by Bill McRae. For those who enjoy Montana's exceptional wildlife resources, the act's 50th anniversary this year is just cause for celebration. The "wanted" poster seeks the masked stranger, and the reward is paid only if one is found alive, wild, and free. Subject of the poster—the black-footed ferret, captured on our inside front cover by LuRay Parker—is among the most rare and critically endangered species in the United States. The colorful, captivating display of flowers in front of Montana's Capitol is one of the most snapped shots in the state; Mike Gurnett's back cover photo shows you why.

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Celebrating 50 Years of Pittman-Rol

Here's To The Sports

by William Phippen

For those who enjoy Montana's exceptional wildlife resource, 1987 is a year of celebration.

It's not an observance that will be marked with picnics at county fairgrounds, dances in roadside honky-tonks, or parades headed by high school bands. Rather, the celebration has already begun—from the heavily timbered high country around Libby, to the antelope flats near Alzada. In fact, this celebration is taking place not only in Montana but all across the nation as well.

The reason for this nationwide, yearlong observance? In Montana, we can simply look out a window on our cross-state travels to find the answer. The large herds of antelope we see in many portions of eastern Montana are part of the reason, as are our splendid elk and deer populations and the wild Merriam's turkeys that now inhabit several parts of the state.

This year—1987—marks the 50th anniversary of the Pittman-Robertson (P-R) Act, landmark federal legislation that helped to save America's wildlife.

STEVE WIRT

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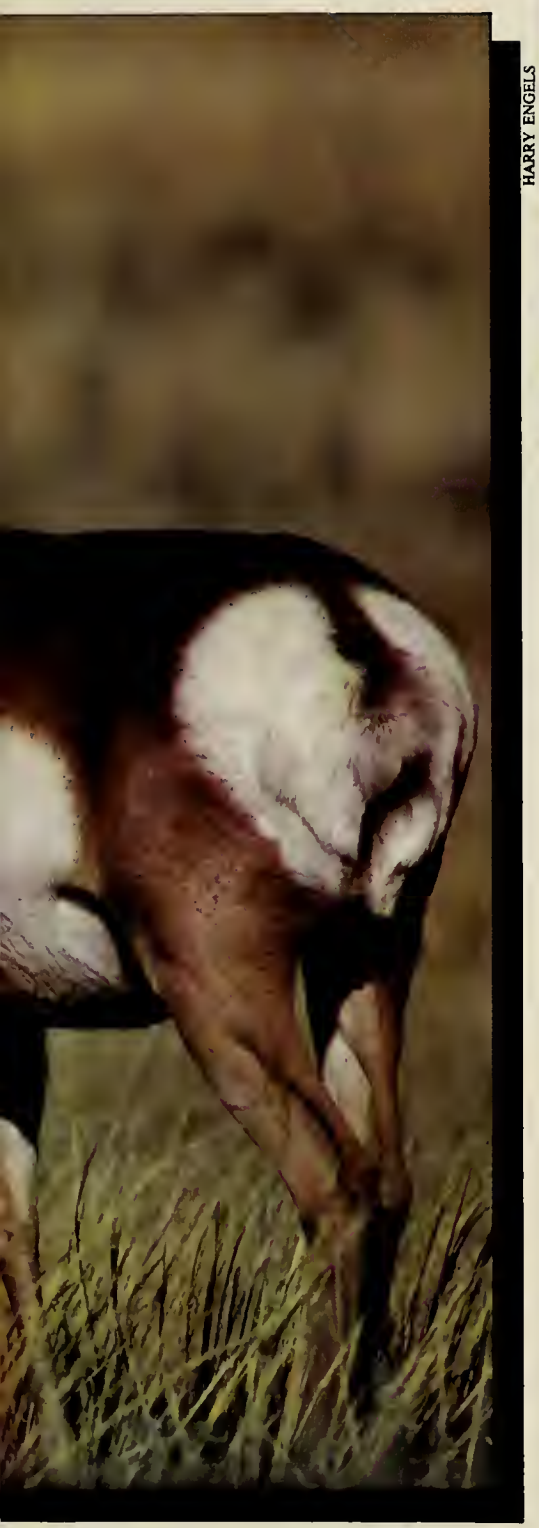


HARRY ENGELS

MARK VAN DONSEL

This year marks the 50th anniversary of the Pittman-Robertson Act, a landmark piece of legislation that has made a lasting difference in conserving and enhancing America's wildlife resources. Antelope (left), bighorn sheep (above), and white-tailed deer (far left) are among the many species that have been brought back to adundance through wildlife restoration efforts.

Were it not for the funding and focus on wildlife brought about by this legislation—officially known as the Federal Aid in Wildlife Restoration Act—it's quite possible that elk hunting in Montana would now be confined to special hunting preserves and that a high-racked whitetail buck would be an uncommon image in a Big Sky photographer's lens. It's also probable that large bands of antelope would not be common on the plains east of Harlowton and that the wild turkey would be purely the stuff of a Montana hunter's Thanksgiving dream.

Almost single-handedly, this act has (1) brought about restoration of dozens of wildlife species (in some cases it has even provided for numbers beyond their former abundances), (2) directly made possible the acquisition and development of four million acres of prime wildlife habitat, and (3) provided funds for responsible wildlife management on 10 times that amount of land. Equally, or perhaps more, important is the fact that the P-R Act is largely responsible for making modern wildlife management the success story it is today. The habitat acquisitions and management opportunities afforded by the act have benefited not only hunters but also all who use and enjoy our rich wildlife heritage—as photographers, bird-watchers, hikers, and others who delight in simply viewing wildlife.

Realizing that this single piece of legislation could lead to the salvation of America's wildlife resources demanded incredible foresight. And it is these citizens with an eye toward the future we should thank for the wildlife riches we enjoy today.

Who were they? They were those same citizens who have paid for wildlife all along—the sportsmen, primarily the hunters, of Montana and the rest of the nation. In 1937, these sportsmen did the almost unthinkable: They **asked** that **they specifically** be taxed. The P-R Act's eventual passage extended a 10% excise tax on all purchases of sporting arms (shotguns and rifles) and associated ammunition. It also apportioned the revenues collected back to the states, on a 75% federal/25% state cost-matching basis, and assigned these revenues sole-

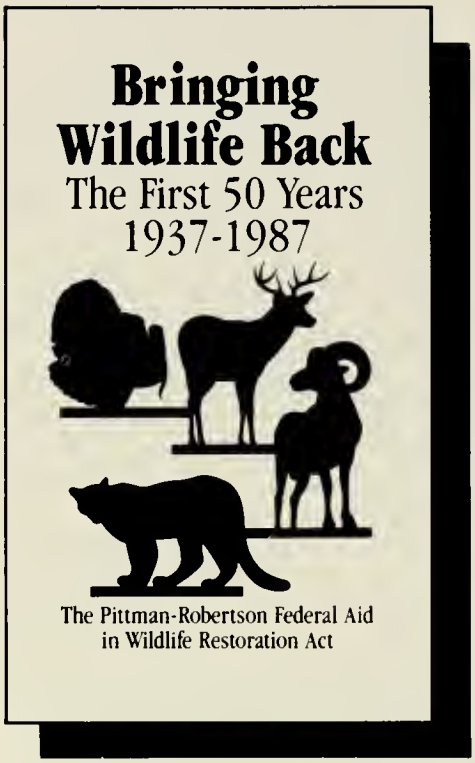
ly for use in managing and restoring wildlife and its habitat. Since the act's initial passage, it has been amended to include a tax on archery equipment, handguns, and handgun ammunition. Provisions also have been added to allow P-R funds to be used for hunter safety training, shooting range development, research to benefit wildlife restoration, and administration of the funding.

In addition, a requirement has been added that only personnel of state wildlife agencies "trained and competent to perform their duties" can draw from P-R funds. The law also currently dictates that for a state to utilize P-R funds, all hunting license revenues derived by the state must be used solely in the context of wildlife conservation or for purposes related to hunting.

The charge of the P-R brigade was led initially by Jay N. "Ding" Darling, a Pulitzer Prize-winning editorial cartoonist for the Des Moines Register. Darling's environmental conscience and skill with an artist's pen, as well as his leadership abilities and dynamic personality, pulled together sportsmen, the sporting arms and ammunition industry, politicians, and others. Darling persuaded these groups to come to the assistance of wildlife during the 1930s, when the nation's wildlife resource was as demolished as the nation's post-Great Depression economy. As chief of the U.S. Bureau of Biological Survey (now called the U.S. Fish and Wildlife Service) from 1934 to 1936, Darling played a major role in setting the stage for the soon-to-be enacted Pittman-Robertson legislation.

Darling's involvement with P-R wasn't his first jump into the wildlife restoration arena. In 1934, he was instrumental in gaining passage of the federal Migratory Bird Hunting Stamp Act, and he subsequently designed the first federal "duck stamp" to provide funds for acquisition of wetlands critical to waterfowl. Also, through his influential position with the Biological Survey, Darling, in 1935, laid the groundwork for creation of cooperative wildlife research units, like the one at the University of Montana in Missoula, where structured wildlife research is conducted and graduate level wildlife biologists are educated.

In 1936, Darling chaired the first North American Wildlife and Natural Resources Conference, which brought



leading private and public conservationists together for discussion and action. The conference, ordered by President Franklin D. Roosevelt, led to the founding of the General Wildlife Federation to develop a national wildlife restoration policy. With Darling as its first head, the federation grew into the organization that is now the National Wildlife Federation.

Once the foundation had attained its roots, the difficult task of finding a source of steady funding for the restoration of wildlife was begun. An already existing federal excise tax on hunting arms and ammunition seemed the logical vehicle for achieving this goal. Legislation to extend and redirect the tax was proposed by Carl Shoemaker, a special investigator on wildlife matters for the U.S. Senate, former lawyer, former newspaper publisher, and former Oregon state fish and game commissioner. The proposed legislation garnered immediate support from major sporting arms and ammunition manufacturers as well as the support of Sen. Key Pittman of Nevada and Rep. (later Senator) A. Willis Robertson of Virginia. Both submitted identical bills that passed the House and Senate; the measure was signed into law by President Roosevelt in September 1937.

The huge success of P-R is evident in the almost $2 billion (including state contributions) that have been invested through the fund into wildlife restoration efforts in the nation since the law's inception. In 1986, state revenues from the tax totaled nearly $121 million. In 50 years, Montana has received almost $43 million from the fund; in 1986, $3 million was apportioned to Montana.

But the money directed back to the states through the fund represents only one part of the P-R success story. We only need to look around us to see the other. The research, habitat improvements, and wildlife management efforts that P-R funds have supported have been invaluable to wildlife.

Consider that in 1895 only about 350,000 white-tailed deer are thought to have lived in **all** of the United States. This is a small figure when you realize that over 14 million call the nation home today. Elk, similarly, have increased dramatically, from about 40,000 in all parts of the country in 1907 to nearly 500,000 today.

Further consider that there were only an estimated 25,000 pronghorn antelope left on the plains of Canada, the United States, and Mexico in 1924, but their numbers have exploded to over 2 million today. Also, over 2 million wild turkeys across the nation now inhabit all of their former range, whereas a 1949 report showed they had been completely eliminated in 19 states they formerly inhabited. Many other wildlife species have fared as well, some simply rebounding in numbers, others restored to their former ranges.

The resurgence of wildlife populations has been as dramatic in Montana as anywhere. Consider the following, as outlined by Mike Aderhold in his article, "Looking Ahead," in the March/April 1986 issue of *Montana Outdoors*:

Elk

In 1910, by all accounts, there were fewer than 3,000 elk in Montana north of Yellowstone National Park. With protection, transplant programs, and the purchase of critical wintering areas, **elk have increased today to somewhere around 100,000**. Elk harvest by hunters before 1950 averaged less than 10,000 annually. The 1984 elk harvest of 18,478 was 1,356 more than the previous high (1983), and came close to

MICHAEL H. FRANCIS

At the turn of the century, the moose was nearly extinct in the Rocky Mountains south of Canada. Due to management efforts, Montana's moose herd now numbers about 10,000 animals.

doubling the 1965, 1972, and 1976 harvests.

Antelope

Antelope are also at or near a population high for this century. They now inhabit about 41% of the state, and the 1984 hunter harvest of 28,588 was roughly 10,000 more than the average annual harvest during the 1970s. The population has skyrocketed from an estimated 3,000 in Montana in 1924 to **more than 100,000 today**.

White-tailed and Mule Deer

In the 1930s, deer—both white-tailed and mule—were considered scarce in most of eastern Montana. But in 1984, 34% of the state's deer harvest came from the southeastern portion of the state (Region 7, with headquarters at Miles City). Deer harvest in this single administrative region in 1984 exceeded Montana's statewide deer harvest in any year from 1900 through 1952.

Mule deer now inhabit more than 90% of the state. Eastern Montana populations experienced historical highs in 1983 and 1984, and populations west of the Continental Divide were second only to those seen in the late 1950s and early 1960s. Statewide, the 1984 mule deer harvest by hunters was 112,873, almost triple the statewide harvest in 1976 and **8,500 more than the previous high of 104,300 in 1962**.

White-tailed deer are now found in every county and along every major water course in the state. Like the hunter harvest of mule deer, **the 1984 whitetail harvest, at 56,761 animals, was the highest ever recorded**.

Bighorn Sheep

By 1930, Montana's bighorn sheep herds, which were once healthy and contained numerous sheep, had been reduced to small, remnant bands. Montana's sheep were unproductive, unhealthy, and were considered an endangered species by some. Studies in 1941 showed that Montana's bighorn populations were at an all-time low.

Montana now has 34 distinctive bighorn populations with herds in every one of the seven administrative regions of the department (Kalispell, Missoula, Bozeman, Great Falls, Billings, Glasgow, and Miles City). These herds comprise an **estimated total population of 5,000 to 8,000 animals**. The 1983 and '84 hunter harvests of 349 and 278 animals were the highest ever recorded.

Moose

In 1900, moose were believed extinct in the Rocky Mountains south of Canada and outside Yellowstone National Park. No moose hunting was permitted in the state between 1897 and 1945. Moose now inhabit about 18% of Montana's area, and **number between 8,000 and 11,000**. In 1985, 18,562 hunters applied for 616 permits in 62 hunting districts. In recent years, the annual hunter harvest has averaged about 500 animals.

Merriam's Turkey

Historical records indicate that the Merriam's turkey was not native to Montana. Nonetheless, from an initial transplanting in 1954 of 13 Colorado turkeys (five gobblers and eight hens) into suitable habitat near Lewistown, **Big Sky hunters now harvest about 1,700 of these regal birds annually** from the state's growing turkey populations.

But state wildlife agencies, including the Department of Fish, Wildlife and Parks, and the wild creatures they manage aren't the only ones to have benefited from the P-R fund. Indeed, everyone who values wildlife and the richness wild creatures bring to our lives has benefited directly from the funds the P-R program provides. For example, since 1958, when Montana's Hunter Education Program was first instituted, over 210,000 Montana youngsters have been trained in safe gun handling and other aspects of hunter education, thanks to the matching funds the program provides. Think again, too, of all the habitat that has been acquired to support the many forms of game and nongame wildlife all Montanans enjoy.

As we celebrate the golden anniversary of the P-R Act, let's not forget those who had the concern to see the legislation through to its enactment, the dollars sportsmen have paid through the act, the invaluable habitat acquisitions it has funded, the ways wildlife population have rebounded, and all the other related benefits the act and the funding it provides have offered to all Montanans.

To be sure, the past successes of the P-R Act should make us optimistic about the future of wildlife and recreational hunting, not only in Montana, but throughout the nation as well.■

"See" First

by Tom Pick
illustrated by Diane Nugent

Have you ever waited at dawn to watch a fickle sun bring its measure of life or death to your efforts? Crops, stock, water, and forage all depend on the degree of fit between the whims of climate, land, and the observer's guesswork. Day in and day out, nature shrewdly negotiates. For the landowner, there is no upper hand possible.

The experience fosters a humble understanding of what nature can give, and what the land can provide. Or what it can't. Ranchers and farmers who have been molded by these tenuous circumstances are more than landowners. Successful at balancing their lives and operations with the uneven rhythms of the land, they are more.

The hefty price of ownership has bought them a ticket in the front row as stewards. Property owners, yes, but stewards first: managers of resilient but delicate resources no honest person can hold and own, or can squander and ruin intentionally. For all time, the intricate flow of elements that make up our meadows, rivers, rolling plains, and timbered mountainsides are here for our wise use. The stewards have paid for and accepted both the honor and the burden of trust.

Even the crustiest landowners will admit to the constancy of the land, with or without their ownership. And yet, it is the steward who marks and symbolizes the land. For the best of them become the land. Sightlessly, their eyes can gauge its curves, their limbs measure its breadth, and in their bones they feel its fertility. They are the land and everything the land is: home, provider, resource, and haven.

So what does this have to do with hunting and fishing? A lot. In 1986, there were more than 23,000 agricultural producers in Montana*. It can have a great deal to do with where we are able to hunt and fish, or even, if you wish, to gather berries from the wild.

From the perspective of those who make the land their lifework, it is no wonder that those of us who come calling, with eyes for only what can be taken, are resented and turned away by the orange paint or at the asking.

To understand—to "see" the mosaic of land and owner—requires an effort, for the owner has the advantage. He has felt the fury of blizzard and hail, and the soft caress of lush growth. Through all, he has made his peace and discovered that which ties him to the land. The ties may be many; the tie may not even be known, may not even be expressed by words, but it is there, or the stewards would not be.

Beauty, it is said, is in the eye of the beholder, and is only skin deep. The steward sees the beauty of land not solely in its appearance, but in what it provides, and by what he or she has returned to the land, a history, a pattern of seesaw give and take not obvious to the anxious sportsman.

Imagine you have labored in isolation, nurturing a complex sculpture created by nature, but shaped as much by your hands' restraint as by what you have touched. I don't know about you, but if it were mine to share, I think it had damn well better draw some response from the viewer. When we stop for a few minutes to ask permission, we are the viewer as well as the viewed. Yes or no to our question, a few comments might be appropriate.

Action and demeanor indicate if we've just come to take, or rather to PARTAKE of the sights and sounds and scents, the history of the land as well as the game and fish.

Although the people of a state hold title to the care of wildlife, it is a fact that fish and game are born of the land, products as surely as grain, beef, or mutton. The abundance or scarcity of game is not always directly due to management, but often is an indicator of the land's health and/or the stewards' philosophy.

Where the land is healthy, and we find beauty, the land's steward must be doing something correctly, even if it is no more than possessing a "hands off" attitude. For as complex as it is to manage land gracefully, it is ever so easily damaged.

As we "see" the stewards and their land, we need to let them know we appreciate their care. Other than personal satisfaction and the land's temporary sustenance, it may be the only thanks they'll ever receive.

And where the land is not healthy, where the stewards are absent, well, we need to find out why and say something about that, too.■

** 1986, Montana Department of Agriculture, Statistics Division, estimates 23,600 producers with an income greater than $1,000 annually.*

LEE GRAVES

Despite its rough and lawless origins, by 1877 Bannack had a church where Methodist minister W.W. "Brother Van" Van Orsdel held forth. On the weekend of July 18 and 19, the annual Bannack Days celebration will re-enact the excitement of the frontier.

DICK ELLIS

LEE GRAVES

A rip-roaring mining town where gunfights and murder were common, Bannack soon had need for a gallows and a cemetery.

LEE GRAVES

LEE GRAVES

The Bannack jail, built in 1862, was the first in Montana Territory.

See You in Bannack

by Dick Ellis

The sounds of a bustling frontier mining town float across Grasshopper Creek and echo from the slopes of Bannack Peak. Bits of conversation, children laughing, the creaking noise of boots on boardwalks, and the music of horse-drawn wagons mingle with toe-tapping tunes rising from Skinner's Saloon. The sharp crack of gunshots up Hangman's Gulch draws curious glances from the busy miners bent over their gold pans.

Bannack of the 1860s? No, this is Bannack of the 1980s during the Bannack Days celebration at Montana's foremost historic park. Each year, near the end of July, the town comes alive for a weekend of historically oriented activities and displays. During the weekend of July 18 and 19 this summer, over 3,000 people will visit Montana's first Territorial capital to join in the fun.

On July 20, 1862, just 125 years ago, gold was discovered on Grasshopper Creek and thousands of anxious miners rushed to the Territory hoping to strike it rich. Bannack was born on the banks of the stream and exploded into a rip-roaring mining town where gunfights and murder were common, and a scheming sheriff contrived to become the secret leader of a gang of merciless outlaws.

Bannack soon matured into a more respectable community, supporting civilized institutions such as schools, churches, and fraternal orders as well as an array of doctors, lawyers, and merchants to serve an optimistic populace. But, optimism was not enough to sustain Bannack. As gold deposits were slowly depleted, the town was all but abandoned and time and neglect took their toll.

The people of Montana did not forget the excitement and

drama of those early years, however; in 1954, Bannack became one of the first units of a fledgling state parks system. Since then, it has evolved into a major historic park through purchase of private inholdings, stabilization of significant buildings, and development of a comprehensive interpretive program which includes a self-guided tour and a new visitor center.

Although the park is open year-round and thousands of visitors enjoy a leisurely stroll into the past, the Bannack Days celebrations provide a chance to take part in activities and view displays not provided at other times of the year. Visitors can look forward to a weekend of old-time music, horse and buggy rides, a frontier church service, black powder rifle shooting, frontier arts and crafts, good food (featuring buffalo steaks and burgers), gold panning, and much more.

Bring the family to Bannack State Park, just 25 miles west of Dillon and share in the fun. See you there!■

DICK ELLIS

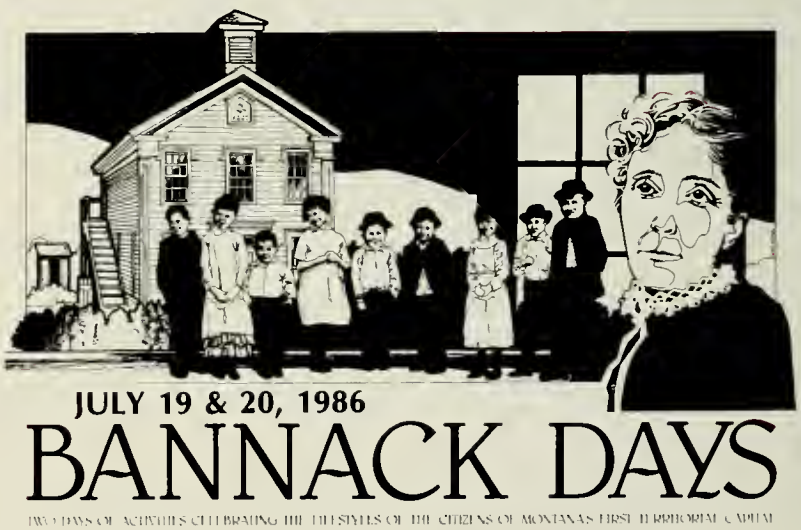
During Bannack Days, visitors can enjoy old-time music, horse and buggy rides, gold panning, good food, and much more.

Bannack Days Posters Available

Since 1985, the Department of Fish, Wildlife and Parks has printed annual Bannack Days posters of historically oriented art suitable for framing. These 16" x 22" collector's prints are available at $5 each for unsigned copies and $20 for limited edition copies signed by the artist. Add an additional $1 for postage.

To order, send your check or money order, made out to Department of Fish, Wildlife and Parks, 4200 Bannack Road; Dillon, MT 59725.

Posters from 1985 and 1986 are still available and the 1987 edition will be available July 1.



Montana's Centennial—A Time to Smell the Flowers

Come next spring, if a Department of Fish, Wildlife and Parks fund-raising drive is successful, it could take a little more time to smell the flowers on Capitol Hill in Helena.

Shutter bugs, out to capture one of Montana's most photographed attractions, will have to use a wide-angle lens to frame the planned floral design of Montana's Centennial logo that will be planted at the foot of the statue of saber-rattling Thomas Meagher.

The DFWP Parks Division, responsible for maintaining the landscaping of the Capitol complex in Helena, each year sets 16,500 marigold, lobelia, and alyssum plants in front of the Capitol in a colorful white, blue, and gold display that boldly spells "Montana" and depicts the current year. Cost of Capitol Hill landscaping, including the floral display, is borne by individual state agencies through their building rental charges.

In 1988 and 1989, however, plans call for the popular floral display to honor Montana's state centennial celebration. The extra costs for the expanded display must be raised outside state government through private donations, said DFWP Parks Division Administrator Don Hyyppa.

The expanded display—planned to be twice as large as the floral arrangement on this issue's back cover—will cover 4,526 square feet with 323,175 flowers duplicating Montana's red, white, and blue centennial logo.

The total cost of the centennial display for 1988 and '89 is estimated at $35,000. Hyyppa said he hopes funds for the project will be generated through donations from private individuals, service groups, corporate interests, and private businesses. Hyyppa said the project was enthusiastically endorsed by the Centennial Commission.

Each year the Capitol floral display is planted with the help of volunteers from Helena's Green Thumbs, a senior citizen group that participates in a Montana Department of Labor program sponsored by the Farmer's Union of Great Falls. Additional labor is provided by local students employed by the Parks Division during the summer.

DFWP Landscape Architect Paul Valle said planting of the display begins the first week of June. He said it usually takes a full week to grid, stake, and plant the arrangement. "In Montana, June 1 is about the earliest we can get the flowers in," he said. "If you plant before that, chances are you'll have a frost and then you're out of luck."

Valle said if the weather cooperates, the display, in all its color, could survive through late October.

Donations for the Montana centennial floral display can be sent to: Floral Display Fund, Department of Fish, Wildlife and Parks, Capitol Station; Helena, MT 59620; make checks payable to Centennial Floral Display Fund.

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Kalispell Offers Pretty Pictures in July

The Third Annual Wildlife and Nature Photography Expo opens July 19 at Lone Pine State Park and Visitor Center near Kalispell. Its theme is wildlife, scenic, and nature photography, and organizers bill it as the "largest wildlife and nature photography show in Montana."The expo opens at 11 a.m. and runs until 7 p.m., and admission is free.

The expo attracts professional and amateur photographers such as Steve Wirt, Tom Ulrich, Joe Potoczny, William Munoz, John McCarthy, Tim and Debbie Manley, Louis M. Kis, Tom Holland, Bert Gildart, Diane Ensign, and Rick Bartel.

Prints, date books, cards, books, calendars and posters will be for sale. A barbecue will be served at 1 p.m. for those interested in picnicking with the photographers; cost is $3.50 for the barbecue.

Lone Pine State Park, which offers an incredible vista of the Flathead Valley, is five miles southwest of Kalispell. From U.S. Highway 2 in Kalispell, turn south on Meridian Road to Foys Lake Road. After four miles, turn left at the Lone Pine State Park sign. For more information contact Becky Smith, Lone Pine programmer, at 406/755-2706.

LOUIS M. KIS

BOOK REVIEWS

YELLOWSTONE IS..., by Mike Logan, Buglin' Bull Press, 32 S. Howie, Helena, MT 59601; 1987, 94 pages, $9.95 (add $1.50 for postage and handling), soft cover.

This beautiful tribute to Yellowstone National Park, by one of Montana's finest nature photographers and cowboy poets, captures, through pictures and words, the essence of our nation's first national park. Mike Logan has spent many years—winter, spring, summer, and fall—building a superb collection of color photos documenting Yellowstone's natural wonders; these, along with the accompanying verse, make for an eye-pleasing ramble through this sprawling national treasure.

For those who have visited the park, the book will bring back happy memories of Yellowstone's spectacular scenery and wildlife. For those contemplating their first trip, the book will whet the appetite and heighten anticipation.

The success of a picture book hinges on the quality of photographic reproduction; this book, produced in conjunction with Helena's Falcon Press, is simply excellent —the photos are crisp and sharp, the colors vibrant and true.

The problem with most "coffee table" books is that they tend to cost more than the coffee table. This one is a steal at $9.95. It belongs in the library of anyone who holds a special place in his or her heart for Yellowstone country.

"Yellowstone Is..." is the sequel to "Montana Is...," a scenic tour of Montana in verse and photography. "Montana Is..." can also be obtained from the author at the above address for $10.95, plus $1.50 for postage and handling.—*Dave Books*

MONTANA'S FLATHEAD COUNTRY, by Robert C. (Bert) Gildart, Montana Magazine, Inc., P.O. Box 5630, Helena, MT 59604; 1986, 104 pages, $13.95, soft cover.

Filled with beautiful photographs (204 color, 22 black and white), "Montana's Flathead Country" is an excellent choice for anyone needing a memorable gift for out-of-state friends, or for those seeking to learn more about the unique part of Montana encompassing Flathead Lake and Glacier National Park.

Fourteenth in the Montana Geographic Series, the book describes the rivers, flora, wildlife, and social features of the area. Kalispell author Bert Gildart organized the book in four parts: geology, hydrology and wildlife; settlement of the Flathead Valley; the river drainages; and the future of the valley in light of threats to its natural integrity.

In the first part of the book, Gildart explains the hydrologic cycle of the Flathead River, its forks, and Flathead Lake. The complex geologic history of the area also is reviewed, including formation of Flathead Lake and the filling and draining of Glacial Lake Missoula. The author highlights some of the major wildlife species including the bald eagle, osprey, grizzly bear, elk, gray wolf, westslope cutthroat trout, bull trout, and kokanee.

In the second part, the author traces settlement of the Flathead Valley by whites, describes early settlers and transportation, and follows to the present the history of towns such as Big Fork, Kalispell, Lakeside, and Polson. Gildart also writes of the major dams on the Flathead (Kerr and Hungry Horse) and provides an account of the flood of 1964.

Gildart describes unique features of each of the major forks of the Flathead River (North, Middle, and South) in the third part of the book. In some of the more vivid passages, the author chronicles his rafting trips down the wild Middle and South forks. Included are accounts of fishing for westslope cutthroat and camping along the river's edge. In a striking description, the reader is taken by rubber raft through the narrow Meadow Creek gorge on the South Fork, where "the canyon narrows so drastically that one can literally step across the river, the raging South Fork, that elsewhere stretches almost 100 yards wide." The author also writes of Flathead Lake (including an estimate of the number of cherry trees along the shoreline), the Jewel Basin hiking area, the "Mad Mile" whitewater stretch of the Swan River, and the Flathead River below Flathead Lake.

Gildart concludes with a review of the man-caused environmental threats (mining, hydropower, and municipal pollution) and the efforts by various agencies and groups to preserve the land and water of the Flathead country.

Gildart has done a good job in combining geological, wildlife, water quality, and social information into an entertaining, readable text. The text and photo captions are in almost all cases accurate (one exception was a photo of a Yellowstone cutthroat trout misidentified as a westslope cutthroat).

"Montana's Flathead Country" is a colorful and attractive book, suitable for the coffee table in any home—Montana or New Jersey. The rich photography and clear text capture the essence of this glacially influenced area of Montana.—*John Fraley, special projects manager, Fisheries Division, Kalispell*

ALL BOOKED UP??

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THE MADISON RIVER, by Craig Mathews and Gary LaFontaine, Greycliff Publishing Co., P.O. Box 1273, Helena, MT 59624; 1986, $12.95, cassette tape.

This 90-minute cassette tape, narrated by Craig Mathews and Gary LaFontaine, is a valuable reference for anyone planning to fish Montana's Madison River. The first of Greycliff Publishing Co.'s "River Rap Series" (Henry's Fork now available, Big Hole to follow), the tape describes the river's physical characteristics, the fish, the insect hatches, and the most effective fly patterns and fishing techniques for various times of the year.

The first side of the tape breaks the 120-mile length of the Madison into 11 sections (for example, Madison Junction to Seven Mile Bridge, Slide Inn to the West Fork, etc.). Each section is described in detail—the type of water, the hatches by season, and the techniques that work best. The second side delves into the hatches, fly patterns, and methods in greater detail. One portion is devoted to the Madison's famous salmonfly hatch, while others deal with mayflies, caddisflies, and terrestrials.

The tape is tightly edited—it contains virtually 90 minutes of information gleaned from years of on-stream experience by two knowledgeable anglers. For the average fisherman to assemble this much useful data from tackle shop owners, fellow anglers, and hard-won experience would take several years and many, many trips to the Madison.

Listening to this tape before a trip to the Madison (or in the car on the way) is an enjoyable way to whet your trout fishing appetite and enhance your success.—*Dave Books*

NONGAME NEWS

THOSE HOT SUMMER DAYS

The thermometer registers 98 degrees and you retire to the shade of an old cottonwood tree, sipping a tall glass of ice-cold lemonade. A quick dip in the Missouri River is another refreshing way to escape the often hot days of August in Montana. But what about those many nongame species that also must exist during those days with exceedingly high temperatures? Although you might not see a lizard sporting sunglasses or dabbling its toes in the city pool, many nongame animals have unique adaptations to cope with hot summer days.

Regulating body temperature (called "thermoregulation") is a necessary mechanism for all animals, not only for survival but to increase the efficiency of their metabolism. Enzymes necessary for normal body functions work best within a narrow range of temperatures. Most animals, such as reptiles and amphibians, are "ectothermic" and regulate their body temperatures by heat loss or gain from the environment. Birds and mammals are "endothermic" and regulate their temperature by their own internal metabolic processes and modifications based on heat exchange with the environment. Both the endotherms and the ectotherms have developed methods for surviving periods of heat stress.

Many animals employ simple strategies to avoid the hottest part of the day—similar to our siestas under cottonwood trees. Most small mammals are active only at night and remain in their cool burrows during the hottest part of the day. Marmots position themselves lengthwise toward the sun to lessen the effects of direct rays. Two Montana lizards, the short-horned lizard and the sagebrush lizard, are diurnal (active during the day) and find cover from the sun under rocks or by partially burying themselves in moist sand.

Great blue heron
JAN BONHAM METZMAKER

Many other animals exhibit behavioral adaptations to avoid heat stress. When bats are roosting, they move away from the top of the roost where it's hotter. When it's extremely hot, bats salivate and lick exposed skin to enhance cooling by the moisture's evaporation. Birds under stress from high temperatures often pant. By speeding up their breathing rate, more air flows over the moist surfaces of the respiratory system and reduces body heat by radiation. Some birds, such as owls, great blue herons, and nighthawks, supplement panting and hasten evaporative cooling by pulsing their throat skin in and out (called "gular fluttering").

A few species have developed more sophisticated physiological mechanisms for dealing with heat. Jackrabbits' large ears have numerous capillaries to increase the blood flow to the ears and allow greater heat loss. Jackrabbits and kangaroo rats are also very efficient in conserving water. Both have highly concentrated urine and dry feces. The northern pocket gopher has increased blood circulation to its naked tail as a means of dissipating heat. Studies indicate that tail length varies with elevation: northern pocket gophers occupying higher altitudes have shorter tails than those living in the lower, hotter valleys.

Desiccation associated with high temperatures can be a serious problem for most amphibians. Many frog species burrow in sand or occupy the burrows of small mammals. The spadefoot toad is more tolerant of desiccation and has developed several unique mechanisms for water conservation. Spadefoot toads can rehydrate by absorbing water through the thin skin on their belly. They are also able to compartmentalize the available body water in several ways. Kidney functions cease and the amount of water in the blood increases. Only certain major organs such as the brain, heart, and stomach contain high amounts of water.

Reptiles generally tolerate higher temperatures than other animals and often exist with body temperatures close to the lethal range. Lizards use their long legs to keep away from the hottest surface temperatures. Most lizards, as well as amphibians, also can change color to reduce heat absorption. Thus the lizard in partial shade of a sagebrush will have both dark skin and light skin, depending on its location in the shade.

The next time you enjoy a cold beer in your air-conditioned living room, remember you've got it easy compared with some of the other inhabitants of Montana.—*Marilyn Wood, DFWP wildlife biologist, Kalispell*

FENCES AND HUMMINGBIRDS

A reader writes:
Gentlemen:

Over the past 10 years, we've managed to develop a rather large following of calliope and rufous hummingbirds around our home. Unfortunately, we've also discovered a problem that is almost always fatal for them. We have horses, and probably the most cost-effective way of containing them has been through the use of electric fencing. (Ours consists of rebar stakes with red plastic insulators.)

Calliope hummingbird
JAN BONHAM METZMAKER

Within a month of setting up the fence, I found seven dead hummingbirds on a 600-foot section of fence. All the hummingbirds were found hanging from the wire immediately adjacent to an insulator. The birds are obviously attracted to the bright red insulators, perch on the wire, and attempt to feed from the insulator. When they touch the metal stake the insulator is attached to, they are immediately electrocuted.

All the components of this electric fence were purchased at a local ranch supply store, and efforts to find insulators that were not a bright color were unsuccessful. As a result, we were forced to spray the insulators with flat black paint.

I'm sure this is not an isolated problem, and should (and will) be addressed to the manufacturer of the insulators. Perhaps a short note in your publication will help stop the needless death of these beautiful little creatures.—*Alan G. Anderson; Lolo, Mont.*

* * * * *

• *We would like to include more on this topic in a future issue. We urge other readers to send information to* Montana Outdoors.

CONTRIBUTORS

• Call your hunting partner, sit down and have a beer, and clink your mugs together with the toast, "Here's to the Sportsman!" You have just cause for celebration: It's the 50-year anniversary of the Pittman-Robertson Act, and the act has probably done more for wildlife restoration than any other piece of legislation. From bighorn sheep and antelope to Merriam's turkeys and elk, funds from P-R, as the act is called, have been used for purchase of crucial habitat, for wildlife research, for wildlife management, and much more. In the last 50 years, Montana has received almost $43 million from the fund; in 1986, $3 million was apportioned to the state. Turn to **William Phippen's** article on page 2. Phippen is an information officer in the department's Conservation Education Division in Helena.

• In *Montana Outdoors'* continuing "Perspectives" series, **Tom Pick** urges those who come calling to " 'See' First." We are the ones who come calling—seeking to hunt, fish, or to gather berries on someone else's land. What he's asking us to "see" is the complex mosaic of land and owner. He asks us to think about the "fury of blizzard and hail, and the soft caress of lush growth" that shape the landowner's ties to the land. He also urges us to say "thank you," and notes that, other than personal satisfaction and the sustenance the land offers, it "may be the only thanks they'll ever receive." Pick, a free-lance writer living in Bozeman, is a part-time conservationist with the Soil Conservation Service, although the thoughts expressed in the article are his own. His "Perspectives" piece begins on page 6.

The watercolor for " 'See' First" was prepared especially by Butte artist **Diane Nugent**. She would like to extend thanks to Ed Werner, Whitehall, who posed as the rancher. Nugent has won numerous awards for her watercolors and pen-and-ink drawings, and her prints, watercolors, and portraits hang in collections worldwide. She recently moved and works from her studio at 2214 Ottawa; Butte, MT 59701 (406/782-5255).

• "See You in Bannack" on July 18 and 19. When you read **Dick Ellis'** article, you'll want to be there: Bannack Days celebrations provide a chance to hear old-time music; to take horse and buggy rides; to participate in a frontier church service; to see demonstrations of black powder rifle shooting; and to enjoy some fine food, including buffalo steaks. Turn to page 8 for a look at a town coming alive with historically oriented activities and displays. Ellis is the parks manager for Region 3 (Bozeman).

• Just in case you didn't know, "Mandibles" are "jaws." "Mandibles" is also the title of a provocative article by **Robert T. Bukantis** and **Janet Grinde Bukantis**. The story takes place in Flathead Lake, and the cast of characters includes Flathead's kokanee, the opossum shrimp (*Mysis relicta*), and two species of water flea, scientifically known as *Daphnia*. Turn to their article on page 15. Robert Bukantis is completing his doctorate in zoology at the University of Montana and was a former research associate at the Flathead Lake Biological Station; Janet Bukantis is a native of Polson, holds a B.A. in environmental biology from UM, and has been interested in Flathead Lake all of her life.

Illustration for "Mandibles" was done by **Larry E. Hughes**. Hughes is a chemist at the Flathead Lake Biological Station, where he also lives. He does his humorous, but scientifically accurate, pen-and-ink drawings as a hobby. He has also produced graphics for various publications and projects at the station.

• Yup. There really is a reward offered. Yup. There really are "wanted" posters. Yup. The critter pictured on the poster really is in a lot of trouble. But it's not the sort of trouble you usually think of in connection with a "wanted" poster. The picture on the poster is that of the black-footed ferret, and it is among the rarest and most endangered species in the United States—maybe the world. Turn to **Dennis Flath's** article, "WANTED: The Masked Stranger," on page 18 for a ferret update. Flath is the department's nongame biologist; he works at the Wildlife Division's Research Laboratory in Bozeman.

Karen Ray Brower brings her skill with both color and black and white illustration to the black-footed ferret article. She draws on nature for her artistic subject matter because, as she says, "It is what I know and love best and is a constant source of inspiration. My work typically reveals a very intimately described habitat, a portrait of one tiny niche of the world." Her work has won awards in many Montana shows and is included in private, museum, and corporate collections worldwide. Her studio is also her home, and her work can be seen by appointment at 2828 Goodwin; Butte, MT 59701 (406/494-4179).

• Montana's Hunter Safety Program is 30 years old and **Tim Pool** is convinced that "Volunteers Make It Work." They receive nothing, except satisfaction and the knowledge that they have helped to produce generations of young hunters schooled not only in the safety aspects of shooting, but also in outdoor ethics, the importance of landowner-sportsman relations, and much more. Turn to page 24 for insight into this valuable program and its history. Pool is supervisor for the Recreation Safety Education Program, Conservation Education Division.

• "Chert" isn't an everyday word. It's a kind of glassy rock from which "Quarriers of Stone" fashioned tools. These Stone-Age peoples quarried chert out of limestone—and one of the sites at which they did so is near Three Forks. Turn to another of the "Moments in Montana Prehistory" (page 27) so meticulously prepared by **Les Davis**. Davis is professor of anthropology at Montana State University and he and his students have been researching the open-pit chert site for 14 years.

• Probably the most obvious identifying characteristic of the beaver is its broad, flat tail. The title of **Vince Yannone's** article—"Beavers—Big and Busy"—underscores two other characteristics. Beavers *are* big; they can weigh 60 pounds or more. And they can be busy; sometimes a beaver will work overtime to obstruct a canal or culvert you just cleaned. Turn to Yannone's article on page 32. He is assistant administrator of the Conservation Education Division.

• Goats were the reason **Gary Olson** was in the Badger-Two Medicine country. And these inhabitants of high places were reported on Curly Bear Mountain, ostensibly looking for salt licks. The idea was to find the lick and wait for the goats. This stretch of country is just about unsurpassed as wildlife habitat; it also has great potential for hydrocarbon development. As he writes, "Unraveling the intricate pattern of the various resources and resource uses to the satisfaction of interested parties will be impossible without communication, cooperation, and—above all—common sense." Turn to "Goats, Curly Bear, and Common Sense" on page 34. Olson is a department fish and wildlife biologist in Conrad.

• *MO* wishes to thank the following photographers for their contributions to this issue: **Harry Engels** and **Mike Logan**, Helena; **Michael H. Francis**, Billings; **Lee Graves**, Hardin; **Bill McRae**, Fairfield; **LuRay Parker**, Cheyenne, Wyo.; **Mark Van Donsel**, De Pere, Wis.; and **Steve Wirt**, Whitefish.

MANDIBLES

by Robert T. Bukantis and Janet Grinde Bukantis
illustrated by Larry E. Hughes

The water flea (known to scientists as *Daphnia*) calmly swims along, feeding by filtering out small aquatic plants, called algae, from the water. Suddenly, panic! She struggles to swim away, but...too late! She is quickly snatched up by an opossum shrimp. The shrimp's mandibles (jaws) make quick work of the water flea, shredding her into lifelessness. She is swallowed by the shrimp.

This may sound a bit dramatized and tongue-in-cheek (it is). But similar events actually happen countless times each day in Flathead Lake in northwestern Montana. Predatory aquatic animals have been eating their prey in Flathead long before any of our ancestors set eyes on this magnificent body of water. However, an important new development is that one of the key players in the previous script, *Mysis relicta*, is a newcomer to the aquatic community in Flathead Lake.

Mysis relicta has been a hot topic of discussion in the Flathead Basin the last couple of years. This small relative of the salt-water shrimp recently has gotten into Flathead Lake and is flourishing. *Mysis* apparently migrated or drifted downstream into Flathead Lake from other lakes where it had been planted by the Montana Department of Fish, Wildlife and Parks (DFWP) to provide food for game fish. The potential effect of the newly established population of *Mysis* on the kokanee is at issue.

Mysis is native to many northern lakes and has been planted in several lakes in the United States, Canada, Sweden, and Norway. The introductions were inspired by a successful plant in Kootenay Lake, British Columbia, where kokanee grew to trophy size from feeding on the opossum shrimp. As it turns out, some special characteristics of Kootenay Lake resulted in *Mysis* being available as food for kokanee. *Mysis* are unavailable to kokanee in most lakes because the shrimp stay on the lake bottom during the day, coming up to feed on zooplankton (small aquatic animals which are at the mercy of the currents) near the surface at night, when the kokanee aren't feeding. In Kootenay Lake, upwelling currents apparently unique to this lake washed *Mysis* into shallow water where kokanee could feed on them during the day.

Unfortunately, *Mysis* have not benefited most fisheries they were intended to improve. In almost all cases, newly established *Mysis* populations have been associated with the decline or elimination of open-water, plankton-eating fishes, especially kokanee.

Kokanee fisheries have collapsed or declined in Lake Tahoe (California-Nevada), Lake Pend Oreille (Idaho), and Whitefish Lake (Montana) following establishment of *Mysis* populations. This has caused a good deal of concern over the fate of the kokanee fishery in Flathead Lake. The kokanee is the most sought-after fish in the lake, with annual harvest exceeding 250,000. It provides hours of recreation (about 200,000 hours in 1985) as well as attracting non-local fishermen who spend money in the area, boosting the local economy. A healthy kokanee fishery in Flathead Lake may be worth at least $8

Daphnia **provides "dinner" for both kokanee and opossum shrimp in Flathead Lake.**

million to the local economy. In addition, the kokanee spawning runs in McDonald Creek in Glacier National Park attract hundreds of migrating bald eagles (and thousands of human spectators) each fall. The concern about the kokanee's fate in Flathead Lake is understandable.

The Increase of *Mysis* In Flathead Lake

The influence of the *Mysis* introduction is the subject of a variety of scientific investigations at the Flathead Lake Biological Station (FLBS), a unit of the University of Montana in Missoula. Research has emphasized the expansion rate of the *Mysis* population and the impact of *Mysis* predation on other organisms living in Flathead Lake.

The first lakewide *Mysis* survey in 1983 showed that the shrimp was widely established in the lake, but was not very abundant. At that time, researchers estimated about 120 million *Mysis* in Flathead Lake, or about one *Mysis* for every 3.5 square meters (about 4.2 square yards) of lake surface.

Sampling conducted during the next year indicated that the Flathead *Mysis* population had grown considerably. By September 1984, the *Mysis* population was about one billion. By 1986, it was 50 billion. These numbers represent about 2.5 and 130 *Mysis*, respectively, per square meter of lake surface (Fig. 1). Other lakes, such as Pend Oreille in Idaho and Kootenay in British Columbia, have reported average *Mysis* densities of up to 2,000 per square meter.

Mysis will most likely reach a maximum population level some time in the next couple of years. FLBS researchers predict the *Mysis* population could top out somewhere around 500 billion *Mysis*, or about 1,000 per square meter. This estimate was obtained by comparing lake productivity to shrimp density in other lakes.

Lake Pend Oreille appears more eutrophic (more fertile) than Flathead Lake, and should support a larger population of *Mysis*. At the other end of the scale, there are *Mysis* densities of 100 to 200 per square meter in Waterton Lake in Glacier-Waterton Park. Waterton Lake is much more oligotrophic (less fertile) than Flathead Lake. So it would seem that Flathead could support higher densities of *Mysis* than Waterton.

Other work at the FLBS indicates that nearby Whitefish Lake is quite similar to Flathead. DFWP studies indicate a minimum density of 825 *Mysis* per square meter in at least part of Whitefish Lake. Ultimately, *Mysis* density in Flathead may be similar to that of Whitefish Lake.

The question remains: Since *Mysis* has taken hold and is obviously doing well in Flathead Lake, when will an effect on the salmon fishery be seen? This is a hard question; lakes are very complex and some unforeseen factor may play a decisive role in the final outcome. It is possible that effects on the kokanee may not be observed. Certainly, salmon declines documented by the DFWP in recent years cannot be blamed on the *Mysis* in Flathead Lake—in the past, there just weren't enough *Mysis* around, so other factors were obviously responsible.

Another consideration is that *Mysis* and kokanee coexist in some Montana lakes with no apparent ill effects on kokanee. Ashley and Swan lakes, for example, fit this description. Not

Fish populations and water quality in Flathead Lake may be affected by the opossum shrimp, but no one yet knows exactly what the response will be (photo: Lee Graves).

enough is really known about the interaction of *Mysis*, zooplankton (which are fed on by both *Mysis* and kokanee), and kokanee in these lakes to make any firm statements. However, Ashley Lake does not support very high densities of *Mysis*, and Swan Lake is more shallow and seems to be more eutrophic than Flathead. These lakes differ from Flathead to a greater degree than do Pend Oreille and Whitefish lakes, where problems with kokanee fisheries came on the heels of *Mysis* introductions.

The Importance of *Daphnia*

A key player in the *Mysis*-kokanee scenario is the water flea, *Daphnia*, a type of zooplankton alluded to at the beginning of this article. *Daphnia* is very important in the kokanee diet. Feeding experiments with *Mysis* and other Flathead Lake zooplankton indicate that *Mysis* feed extensively on *Daphnia*. Studies in other lakes have shown that *Mysis* can severely reduce or even eliminate *Daphnia* in lakes. These *Mysis*-induced *Daphnia* declines have been implicated in subsequent declines of kokanee fisheries.

An interesting illustration of the effect of *Mysis* on lake communities can be seen by comparing the zooplankton of two lakes—one with and one without *Mysis*. Researchers compared the zooplankton of Waterton Lake, Glacier National Park, where *Mysis* is native, with that of a nearby and somewhat similar lake, St. Mary, which has no *Mysis*. The St. Mary Lake zooplankton community, with no *Mysis*, was more diverse. Waterton Lake, with *Mysis*, has fewer types of animals; notably rare or absent are *Daphnia* and other similar zooplankton.

A Look at *Daphnia* in Flathead Lake

Two species of *Daphnia* have been important members of the Flathead Lake open-water community in recent years, *Daphnia thorata* and *Daphnia longiremis*.

The largest and the one most important as kokanee food, *Daphnia thorata*, spend the winter as inactive resting eggs. Come spring, the resting eggs hatch into females, which

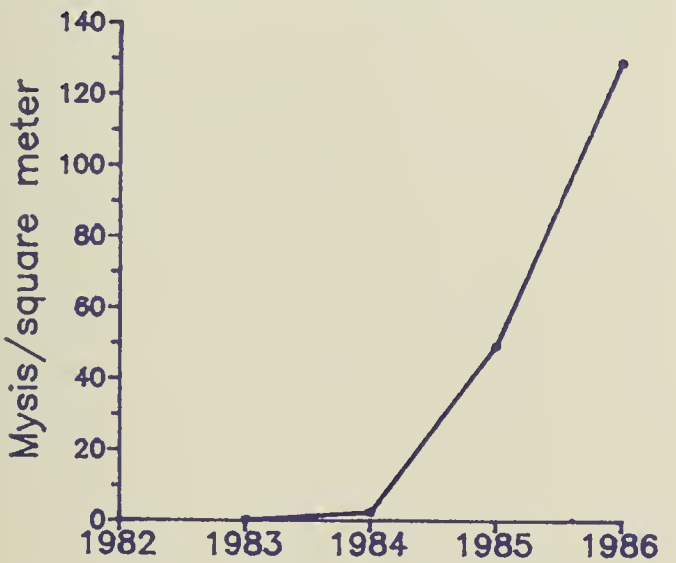

Fig. 1—The density of *Mysis* in Flathead Lake has increased substantially since the first survey in 1983.

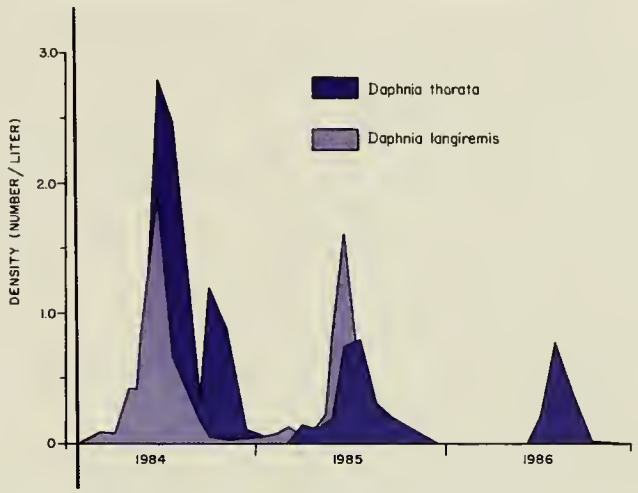

Fig. 2—This figure shows population trends for the two species of *Daphnia* found in Flathead Lake. *Daphnia thorata* is the largest and the one most important as kokanee food.

reproduce without mating. Without squandering any time or energy on males or sex, the population can grow very fast. Numbers continue to increase through the summer and into the fall. They decline, and the *Daphnia thorata* produce more resting eggs and die.

Fig. 2 shows population trends for *Daphnia thorata* from samples collected at the deepest point of Flathead Lake. Note the annual increase of *Daphnia thorata* in 1986 did not occur until July, where in previous years it showed rapid increase months earlier, typically by April.

A similar shift in the timing of the *Daphnia* population increase was noted in Lake Pend Oreille after introduced *Mysis* were established. This shift in peak abundance was thought to be at least partially responsible for the precipitous decline in the kokanee fishery there. Researchers believe that *Daphnia* are critically important as food for kokanee when the newly hatched young fish move into the lake in the spring from the spawning areas.

The temperature characteristics of a lake appear to play an important role in determining the extent of impact that *Mysis* can have on a *Daphnia* population. *Mysis* prefer cold water, and they do not feed extensively in the surface water once it warms up above 15° C (about 59° F). This provides warm-water loving species of *Daphnia* (such as *Daphnia thorata*) with a refuge, where they can live without serious threat from *Mysis*, at least until the lake cools in the fall. So, early in the spring, *Mysis* apparently feed too heavily on *Daphnia* for them to build up in any significant numbers. But once the lake surface warms up, the *Daphnia* have a safe place to live and multiply.

The other previously abundant *Daphnia* species seems to have been even harder hit by *Mysis* predation. *Daphnia longiremis*, formerly present in zooplankton samples taken at any time of the year, seems to have virtually vanished from these samples. Very few *Daphnia longiremis* have been found in samples taken by FLBS personnel since fall of 1985 (see Fig. 2). This *Daphnia* species is active year round, and prefers colder water than *Daphnia thorata*, staying below the warm surface waters in the summer. These characteristics mean that *Daphnia longiremis* is available to *Mysis* as food year round

continued on page 26

WANTED: The Masked Stranger

by Dennis Flath
illustrated by Karen Ray Brower

A hundred years ago, the West was a rough and unsettled place. Newcomers, both evil and good, vied for a niche in the new community. As is common for evolving societies, they often violated legal restraints. "Wanted" posters asked citizen help in seeking retribution for miscellaneous sins against society. "Wanted—Dead or Alive!" was a common slogan, announcing the opportunity for fast cash and social service all at the same time. "Wanted" posters were effective, and they are still used to call the public's attention to serious problems.

Today there is one wanted poster with a promise of a cash reward which serves a new purpose. It's a stark turnaround from the gallery of rogues displayed on Post Office walls. The masked stranger in the picture is wanted alive. And the reward is paid only for finding one wild and free.

The masked stranger is the black-footed ferret—the rarest and most critically endangered species in the United States, perhaps the world. The reward is a last-ditch effort to find what may be the last of the species in the wild, somewhere in the sagebrush-bunchgrass steppes of eastern Montana.

Events of the past few years chronicle what a truly endangered species must face in a world where habitats and land uses have been drastically altered from the pristine landscape in which ferrets evolved and once flourished. It's a chronicle of effort, failure, and renewed determination.

Field searches for black-footed ferrets in Montana began in January 1984. Tim Clark and his crew from BIOTA, Inc. conducted the work under a contract with the Department of Fish, Wildlife and Parks (DFWP) (see "Montana: Crucial Key to Ferret Recovery," *Montana Outdoors*, May/June 1984). BIOTA personnel took the lead in identifying priority areas because of their past experience with the ferret population at Meeteetse, Wyo. Ferrets were apparently doing well there, with 88 counted in summer 1983. Reproduction was quite good, with 60 young in 18 litters. Everyone was optimistic as the Montana searches began. The researchers thought Montana contained large acreages of prairie dogs which had not even been located, let alone mapped. Their enthusiasm was heightened when they discovered two ferret skulls in southeastern Montana on Jan. 24, 1984. At last, here was conclusive evidence that ferrets had been in Montana in recent years.

Many other leads proved to be dead ends, so the DFWP put together specific standards to evaluate reports of ferret occurrence to try to avoid spending so much time on false reports. By fall, the researchers hadn't found any ferrets, but optimism still reigned because things were going well at Meeteetse. In 1984, the Meeteetse ferret count had reached 129 and the population seemed secure. Even if no ferrets were found in Montana, surely the apparent productivity at Meeteetse could provide ferrets for transplanting, captive breeding, or both.

Ferrets and Prairie Dogs

The close relationship and dependence of black-footed ferrets on prairie dogs is practically legendary. Ferrets feed almost entirely on prairie dogs, and in centuries past were probably a major predator of prairie dogs. Ferrets also use prairie dog burrows for shelter, denning, and for rearing their young.

The chance of finding ferrets is closely tied to past prairie dog control measures in an area. From 1914-39, prairie dogs were extensively controlled throughout the West, and they were reduced to only a tiny fraction of their former numbers. The result was a chronological bottleneck for the black-footed ferret. Prairie dog populations sank to such a low level that it became extremely difficult for self-sustaining ferret populations to persist. As a result, most ferrets gradually died out.

Today, there are probably more prairie dogs in Montana than in the last 25 to 30 years. But, ferrets apparently aren't among them and researchers think they failed to make it through the bottleneck of the 1930s-40s.

Thus, the discovery of the ferrets in Wyoming and documentation of their status came as most welcome news. It appeared as a serendipitous opportunity to save a species many had considered extinct.

Ferrets as Eggs in One Basket

But all was not well. Conservationists and agencies expressed concern that having the only known ferrets in the world all at Meeteetse was a lot like having all of one's eggs in

one basket. Disease or a natural calamity could wipe them all out. Pressure was mounting to take some of the ferrets into captivity as a precaution against disaster.

In September 1984, a black-footed ferret workshop was conducted in Laramie, Wyo., to review the status of the black-footed ferret and to discuss options for the future. Those attending examined details of ferret biology, ecology, and history. They also vigorously debated when to begin captive breeding. The "one-basket" situation had made its impression; captive breeding was no longer a question of "if," but "when."

With the management emphasis shifting in Wyoming, Montana's direction also had to be adjusted. Montana's ferret search priorities were realigned to make the best contribution possible toward the ultimate goal of ferret recovery.

The apparent absence of ferrets in Montana and the impending prospect of captive breeding caused researchers to turn their attention to a more sophisticated study of potential transplant sites. The ferret searches had resulted in an assembled body of knowledge about prairie dog distribution and abundance that was more complete than any previous inventory.

As a prelude to possible future transplants, black-tailed prairie dog populations (synonymous with ferret habitat) were identified, described, and evaluated. Researchers tried to leave no stone unturned and they used a uniform and systematic approach, ensuring that the highest-priority sites were selected on the basis of biological criteria. Those criteria included average colony size, the total area of colonies, how many burrow openings were counted, the distance between colonies, and the density of prairie dogs.

Researchers identified eight complexes of prairie dog colonies which appeared suitable for evaluation. They calculated suitability, using a numerical scale called the Habitat Suitability Index (HSI). The procedure and index were based on prior experience and knowledge of ferrets and their habitat among populations that had been previously studied at Meeteetse, Wyo., and Mellette County, S.D.

Areas in order of evaluation and their relative rank were:

County	Site	HSI	Rank
Phillips	South Phillips	0.450	2
Phillips	C.M. Russell NWR	0.445	3
Phillips	Southeast Phillips	0.368	6
Blaine	Fort Belknap	0.531	1
Carter	Terrell Creek	0.420	5
Custer	S. Miles City	0.310	7
Custer	Foster Creek	0.490	4
Custer/Prairie	Custer Creek	0.285	8

Other considerations included land ownership, distance to the next nearest cluster of prairie dog colonies, and the probability of being able to maintain stable, long-term populations. Since the status of complexes and the colonies within them could change, the scientists will periodically re-evaluate them. They will select one or two transplant areas from the top three sites.

The top three sites identified through this review are all in north central Montana: Fort Belknap, South Phillips County, and the Charles M. Russell National Wildlife Refuge. Researchers will continue to evaluate these sites, as well as the five other areas with a lower priority, until ferrets are available for transplant from the captive breeding project (if successful). It will be some time in coming because the first transplants will likely go to Wyoming.

The End of the Optimism

Monitoring the Meeteetse ferrets over the winter of 1984-85 showed a population quite similar to the previous winter. Everything seemed to be going well, and the prognosis for the species was relatively unchanged. But the optimism didn't last.

The events of 1985 unfolded like a nightmare. In June, sylvatic plague was diagnosed among the prairie dogs at Meeteetse. (Sylvatic plague is a highly contagious, fatal disease transmitted by flea bites. It is known in humans as bubonic plague, or "black death," which decimated human populations in Europe many centuries ago. Plague can be easily and quickly treated by modern medicine so it is no longer a hazard to humans. But, it can be devastating to populations of close living animals like prairie dogs.) Initially, biologists didn't know if ferrets were susceptible. But even if the ferrets were immune, the plague could have a devastating impact by wiping out the prairie dogs on which the ferrets depended for food. In response to the situation, the U.S. Fish and Wildlife Service (USFWS) and the Wyoming Game and Fish Department began dusting prairie dog burrows in the affected area with Sevin. (Sevin contains carbaryl which helps to kill the fleas.)

Prairie dog

In spite of these efforts, ferret numbers declined. However, the areas affected by prairie dog die-offs did not correspond with the areas where ferrets were apparently being lost. Also, there was some evidence which indicated that ferrets were immune to plague. A difficult question arose: Were ferrets only *perceived* as decreasing? Had a shift in ferret distribution occurred? Were ferrets dying of starvation? Or, was something else wrong?

On Aug. 29, 1985, the Wyoming Game and Fish Department decided to begin removing ferrets from the wild, holding them for captive breeding. Now there would be two baskets. At first, six ferrets were taken and held for eventual use in a new facility to be constructed in Wyoming. Meanwhile, news from Meeteetse was not good. Locating ferrets was becoming more difficult and by October, researchers could account for only about 30—far fewer than the 130 anticipated.

On Oct. 21, one of the captive ferrets died. News of the diagnosed cause of death struck hard: canine distemper, a

$5,000 REWARD

FOR PHOTOGRAPH OR INFORMATION

Which results in the Verification of one or more live Black-Footed Ferrets in Montana

DO NOT KILL OR TRAP!

DO NOT KILL OR TRAP!

Photos by Tim W. Clark

WANTED ALIVE

BLACK-FOOTED FERRETS AND THEIR LOCATIONS IN MONTANA

IDENTIFYING CHARACTERISTICS

The black-footed ferret (*Mustela nigripes*) is the size of a medium-sized mink, about 18 inches long and 2½ pounds. *Unique features* are a *black face mask* and *black feet*. Do not confuse it with a long-tailed weasel (no mask or black feet) or a domesticated ferret from a pet store. The black-footed ferret is usually found in or near prairie dog towns.

CONTACT

To make a report or to receive more information, contact your nearest regional office of the Montana Department of Fish, Wildlife and Parks, or call or write to:

Ferret Search
Montana Department of Fish, Wildlife & Parks
Box 5, Montana State University
Bozeman, Montana 59717
(406) 994-3285

Sponsored by the
Wildlife Conservation International
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Administered by the
Montana Department of Fish, Wildlife
and Parks

In cooperation with the
Bureau of Land Management
US Fish and Wildlife Service
US Forest Service
Bureau of Indian Affairs
Montana Department of Agriculture

REWARD CONDITIONS

The black-footed ferret is an endangered species protected by very stringent federal and state laws. The reward WILL NOT be paid for any black-footed ferret intentionally harassed, trapped, or killed by the finder. The reward will be paid to the person who provides information leading to the discovery and verification of the existence of the first live black-footed ferret in Montana. Examples of information to supply include: (1) skins and skeletons of black-footed ferrets struck accidentally by cars and found along roads, (2) observations of black-footed ferrets reported on standard forms available from any district office of the Montana Department of Fish, Wildlife and Parks, or (3) photographs.

The reward will not be paid to someone who was on private lands illegally.

The reward is limited to Montana and will expire on October 1, 1988. In the event of a tie or a question concerning the awarding of the reward, the Montana Department of Fish, Wildlife and Parks will be the final judge. The Department may elect to have the reward shared by two or more individuals if warranted. The final burden of proof will be the responsibility of the person(s) making the report, including assisting with the verification.

INELIGIBILITY: Employees of the Montana Department of Fish, Wildlife and Parks and cooperators are ineligible for the reward.

disease always fatal to ferrets and one to which they are extremely susceptible. Researchers took six more, and they were held in quarantine. By January 1986, all of the original six ferrets were dead, but the second six remained healthy.

Apparently because of stress due to capture and handling, captive breeding was unsuccessful in 1986. Few ferrets remained in the wild and on Aug. 29, 1986, the Wyoming Game and Fish Department, in consultation with the USFWS and other captive breeding specialists, decided to capture all wild ferrets left at Meeteetse. Researchers captured 11 more, bringing the captive population to 17. At least one ferret remained at large near Meeteetse, having successfully eluded his would-be benefactors. He was finally captured in Febru-

Black-footed ferret

ary. With the captive population at 18, researchers doubt if any are left in the wild at Meeteetse and surveys this summer should reveal if they are correct. If the ferret is going to recover, several secure populations scattered in a multistate area within its former range are necessary. A long-term program of successful captive breeding and reintroduction now appears to offer the only hope for recovery.

New Importance for the Montana Study

With such a bleak situation in Wyoming, the Montana study took on new meaning. Besides prioritizing transplant sites, a new objective came to the fore: A renewed effort would be necessary to find additional ferrets if they existed. Because of genetic considerations, following loss of so many ferrets in Wyoming, the capture of even one non-related male ferret could be extremely important to the ferret recovery program. It was straw-grasping time. A reward was established, through an agreement with Wildlife Preservation Trust International (a division of the New York Zoological Society). The $5,000 cash reward goes to the first person providing evidence of a live black-footed ferret in Montana. Conditions of the reward are:

1. The evidence must be obtained legally.

2. Permission to trespass on private lands must have been granted by the landowner or his agent.

3. When the DFWP follows up on a report, the person who made the report must assist with the verification.

4. The DFWP reserves the right to follow up only those reports which, by its criteria, provide the best details and substantive documentation of black-footed ferret occurrence in Montana.

5. The black-footed ferret is protected by both state and federal laws and must not be harassed, trapped, or killed.

6. This reward offer expires Oct. 1, 1988.

The reward will be paid to the person who provides information leading to the discovery and verification of the existence of the first live black-footed ferret in Montana. DFWP or USFWS personnel involved in the ferret project or other ferret project cooperators will verify the discovery.

Researchers will evaluate reports sent in by hopeful reward seekers to determine which will result in further searches. Evaluation will include: (a) adequacy of photograph, (b) location relative to prairie dog towns, (c) distance of observation and magnification used, (d) length of observation, (e) description of animal (mask, size, color, etc.), (f) behavior, and (g) experience of observer. Investigators will base their response time for follow-up on the above evaluation and it may range from an immediate response to no response.

The reward offer is limited to Montana and, as the reward conditions note, final burden of proof will be the responsibility of the person(s) making the report, including assisting with the verification.

Reward posters and report forms have been distributed throughout the Montana portion of the former range of the black-footed ferret by the Bureau of Indian Affairs, DFWP, USFWS, and Bureau of Land Management. People who live or work near prairie dog towns should familiarize themselves with the characteristics of the black-footed ferret and carry a report form with them so they can record appropriate information should they happen on a ferret. Mail completed forms to the address provided, or call 406/994-3285 with information about sightings. Additional information, including a film about ferret behavior, is available at regional offices of the DFWP.

One of the most frustrating features of ferret finding is the difficulty with which they are located. Since they are secretive and mainly nocturnal, ferrets are seldom encountered by chance during daylight. More likely, a perceptive observer would encounter ferret evidence such as tracks or digging. Ferret tracks are practically identical to those of a mink. Diggings, however, are unique. Ferrets often deposit a long, narrow section of dirt, coming directly from a prairie dog burrow. The dirt often has a furrow or trench running lengthwise.

Direct observations are usually made at night with a spotlight. Ferrets' eyes have a greenish shine when struck by a spotlight, which helps distinguish them from some other species.

The need to add new blood to the captive population is still as important as ever, so the masked stranger is wanted pretty bad. With luck, someone will lay claim to $5,000 and help save the ferret at the same time. Butch Cassidy and the Wild Bunch never had it so good.■

READERS RESPOND

Olli the Otter

As an elementary schoolteacher in Great Falls, I have used *Montana Outdoors* for years in the classroom. The articles have stimulated reluctant readers to read and the pictures have provided attractive bulletin boards and have stimulated students to write down their thoughts about the pictures. I thought maybe you would appreciate the following story written by a sixth grader after he saw the picture of the otter in your Jan./Feb. 1987 issue. The young author is Erik Omundson of the Meadow Lark Elementary School.

I also would like to thank you for your fine magazine. I retired at the end of the school year, but I know of many other teachers who use your magazine as part of their teaching. I wish you continued success.—*Mrs. Loretta Suhr; Great Falls, Mont.*

* * * * *

• *Once upon a time, there was an otter named Olli. One day, Olli was walking down a path to the pond. He saw something moving in the pond, so he decided to see what it was. He slipped into the water and swam toward it. Olli swam under the water to look at it. "It" was very shiny and had a string around it. The string went up to something that was red and white and bobbing up and down.*

Olli then saw something on shore. It was big and ugly and was holding something. Olli climbed on a rock to see better and knew what he was seeing. He saw two huge rainbow trout. He started toward them but was snatched up off the ground by the big, ugly thing on the shore. He tried to get away, but the big, ugly thing held him. One of the fish was picked up and set down in front of Olli. Suddenly, he felt something good along his back. The big, ugly thing was petting him and stroking him gently.

About this time, the big, ugly thing grabbed a pole and a huge fish jumped out of the water. Olli jumped into the water and grabbed the fish to bring it to the big, ugly thing. Olli was stroked again. Olli thought that he had better stay with this thing because "it" was nice and could catch fish for Olli.

Olli and the ugly thing lived happily ever after.—Erik Omundson, sixth grader, Meadow Lark Elementary School; Great Falls, Mont.

Grinnell's "Bully" Idea

Upon reading "A Bully Idea" in "The Catchall" section of the March/April 1987 issue, I noticed the article stated the Boone and Crockett Club was founded by Teddy Roosevelt.

The March 1987 issue of *Audubon* states that, "George Bird Grinnell and Theodore Roosevelt formed a national organization. It was Grinnell's idea. Roosevelt contributed the Manhattan dinner party that brought the founding patricians together. Collectively they would call themselves the Boone and Crockett Club."—*Laura Salo LeDesky; Santa Rosa, Calif.*

Ross'—Not Snow

I very much enjoy the excellent photography and informative articles that *Montana Outdoors* provides. The feature in the March/April 1987 issue regarding the Lewis and Clark Expedition and their observation and documentation of the winged creatures they encountered was particularly interesting.

However, the answers to the quiz on page 19 indicate that the picture of "white brant" is a snow goose (*Chen caerulescens*) when in fact the bird pictured is a Ross' goose (*Chen rossii*). Although the birds closely resemble each other, there is a distinct difference in their size and particularly the shape, color, and size of their bill.—*Wally Jacobson; Kalispell, Mont.*

* * * * *

• *Thanks for calling the error to our attention.*—Ed.

Emphasize Other Forest Values

After 67 years of logging, including 43 years of tree farming and 33 years of being involved in environmental issues, I have come to the conclusion that one of the biggest problems involving the environment and forest issues is that our forestry schools do not give true multiple use classes. Almost all of the classes are on how to raise and harvest timber. So the foresters think that the only good tree is one that is cut.

If you consider the value of tourism, water, wildlife, recreation, and ecology, they probably exceed the values of timber. I think industry has had too much influence on our forestry schools. But all people help pay for our schools, so I think it is high time that the other values of our forests are given equal attention.

While I realize the Forest Service has some biologists on its staff, I wonder how much they can penetrate the "Teflon" of the "grow-and-cut" that the foresters have learned. This is one of my main reasons for thinking we need a more balanced program in our forestry schools, especially for government and state foresters.

I think if we take care of our watersheds, at the rate of water pollution going on, we will soon be sending drinking water to the rest of the nation.—*Fred Behm; Blue River, Ore.*

Montana Offers Much

Even though I am a resident of Idaho, I feel as though Montana is my home. I spend as much time as possible there, since it seems to offer so much to an outdoors-oriented person.

I enjoy *Montana Outdoors* greatly. Recently, when the rising cost of raising a family made me realize I must cut back on the number of outdoors magazines I subscribe to, *MO* and one other were the only ones I felt I could not be without.—*Larry C. Watson; Wallace, Idaho*

Colorado Fans

I wonder if you would send a copy of your Jan./Feb. photo issue to my father who is an artist; I know he would be most interested in receiving a copy for reference.

My husband and I first visited Montana in 1983 or '84 when he played in the "Last Chance Dixieland Jazz Band" at Helena's summer jazz festival. We fell in love with your state at what seems like the exact moment we crossed the border into Montana. There is no place in the world like Montana and we hope some day to live there permanently.

Please know that you have a great fan (two of them, in fact) living in Colorado.—*Cynthia Goehring; Lakewood, Colo.*

Photo Issue: Cheers

Enclosed is $25; please send as many copies of your Special Photo Issue as it will buy.

I enjoy your magazine all year, but always watch especially for the photo issue. The extra copies are shared with friends of mine who appreciate the beauty of nature, and they have come to look forward to the issue as much as I.—*Earl Boettcher; Springbrook, Wis.*

Montana's Hunter Education Program

VOLUNTEERS MAKE IT WORK

by Tim Pool

Why have the shooting and hunting sports become safer recreational activities for Montanans? Because 700 men and women are dedicated to teaching new shooters and hunters the basics of safe gun handling and fundamental hunting skills.

These men and women are Montana's volunteer hunter education instructors. They freely give their time and skills in teaching hunter education, mainly to Montana's young people.

During the 1950s, the American public became acutely aware of the number of accidents and deaths connected with hunting and shooting. At that time, the National Rifle Association was about the only organization providing training in firearms safety. The 1957 Montana Legislature, in a bill sponsored by the late Sen. Arnold Rieder, directed what was then the Department of Fish and Game to establish a Hunter Education Program. This law also required that youths between 12 and 18 years old pass a hunter education course before they could purchase a hunting license. (Although mostly young people take the classes, adults are also encouraged to do so.)

When this law went into effect in 1958, the safety training consisted of six hours of firearms safety, and the course was called "Hunter Safety." Since then, the training course has been renamed "Hunter Education," and it has expanded to a minimum of 10 hours of instruction. Certainly, this isn't much time in which to train the students in these very important subjects. Only the basics are provided, and students are encouraged to pursue additional information and gain more skill in shooting and hunting techniques. Parents also are encouraged to continue the training or to guide their youngsters in receiving further training from a shooting club or other organization.

The Hunter Education Program provides basic information about hunter ethics, firearms history, safe gun handling, marksmanship, wildlife identification, principles of wildlife management and laws, proper game care, survival skills, and more.

Why does the state of Montana require certification in hunter education? First, it has been proved that this training reduces the number of hunting accidents. This, in itself, would be ample reason to require such education. Safety must *always* be the No. 1 priority when a hunter is in the field or when any firearm is being handled. But hunter education also is geared toward improving the image of hunters, encouraging hunters to conduct themselves in a responsible manner, and improving landowner-sportsman relations.

Hunter education instructors are helping Montana to remain a safe recreational state. These special people are not only working diligently to save the lives of our loved ones and friends, but they are also making our young shooters and hunters better informed citizens.

When the safety program was born in 1957, volunteer instructors had to be recruited. Calls went out to the public requesting help with this program. Many of these "pioneer" instructors are still active in the program today: John K. McBride, Libby; Willard A. Stockwell and Anton Amundson, Jr., Kalispell; Oswald F. Mueller, Ronan; Robert C. Larsson, St. Ignatius; Harold A. Gregg, Polson; Richard C. Kenck, Augusta; Joseph M. Dutton, Sand Springs; Carter P. Jermunson, Brady; Donovan D. Weisgram, Conrad; Frank Loch, Jr., Dutton; M. Sterling Wardell, Chester; Ralph H. Friede, Havre; Ernest O. Paulsen, Chinook; George G. Rice, Big Sandy; Lones W. Wigger, Sr., Carter; Robert McDonald, Circle; Frank Kucera, Winifred; Miles A. Bateman, Jordan; Howard J. Sissel, Sidney; Anthony J. Annalora, Miles City; Howard F. Allen and Alva A. Fortner, Biddle; James V. Pope, Huntley; Albert L. Meier, Columbus; Charles M. Armstrong, Cardwell; Theodore W. Bisch, Whitehall; Frank C. Moore, Sheridan; Kenneth C. Peterson and Chris L. Vuicich, Anaconda; Buff R. Hultman,

BILL THOMAS

Some of Montana's "pioneer" hunter safety instructors are pictured. These dedicated volunteers were with Montana's hunter safety program when it began in 1957 and they're still active. Pictured left to right, front row, Theodore Bisch, James Sivils, Richard Kenck, Robert Larsson, Carter Jermunson, Donovan Weisgram; middle row, Robert Hall, Robert McDonald, Sterling Wardell, Junior English, Frank Loch, Oswald Mueller, Albert Meier; back row, Howard Allen, Ernest Paulsen, Harold Gregg, Anthony Annalora, Anton Amundson, and Miles Bateman.

Drummond; Junior L. English, Hinsdale; Robert A. Hall, Plentywood; Dale H. Smith, Hamilton; Lawrence W. Burlingame, Missoula; Gerald W. Massee, White Sulphur Springs; Tom C. Taylor, Ekalaka; and James J. Sivils, Charlo.

These instructors and the other instructors throughout the state are volunteers. They receive no money for their efforts. These men and women are not professional instructors. Some are teachers; others are business people, mechanics, office workers, your neighbors. They all live in the communities in which they teach, and they support the movement to make the shooting and hunting sports safer and more enjoyable for all.

Many of the "pioneer" instructors reflected on the past 30 years of teaching. Here are some of their thoughts:

- Lawrence Burlingame—"In the beginning there weren't enough instructors and the classes were too large. I'm glad to see things change. Better teaching materials. I now have one of my earlier students teaching with me."
- Alva Fortner—"I have asked people who have been involved in a hunting accident (shot) to come to class and talk about it and to show the students what it looks like. It sure gets their attention."
- Lones Wigger—"Hunter Education sure is needed. It's good and can get better. Many fathers appreciate the education their kids get. The kids correct the fathers. I teach and treat the kids as if they were my own."
- Robert Larsson—"One of my students got himself lost. Everybody was looking for him. He came out alive after a long time. The boy said it was what he learned in hunter education that helped him survive."
- Chris Vuicich—"I always tell the students—several times—never to point the gun at any person. About three years ago, a student came back to me and told me that he had tripped while hunting and the gun went off. His friend was in front of him. He had remembered what I told him, and luckily, the gun was pointed to the side."
- Miles Bateman—"I am involved in the Boy Scouts, too. At camp, the boys get to shoot at targets. Every Scout gets a little bit of hunter education before shooting the guns, even though I can't do the whole course."
- Bob McDonald—"It has been interesting to have been in the program and to have witnessed the changes. One thing that has not changed is the great bunch of people who have made this thing go, mainly the instructors and department personnel."
- Al Meier—"I am wondering if the kids we're teaching now are going to have a chance to hunt on private land."
- Willard Stockwell—"A small percentage of the students really need the classes; some kids know the information already but all do learn something from the classes."

Arnold Rieder felt strongly about safety training. In addition to serving a five-year assignment on the Montana Fish and Game Commission, Mr. Rieder was a dedicated hunter education instructor, and is considered the father of hunter education in Montana. He died in 1985. His son, Dave, is continuing the Rieder dedication to safety training. Dave is an instructor in Boulder and has feelings similar to his father's. "When Dad was a boy in Illinois, his nickname was 'Dan,' for Daniel Boone. He had the outdoors in his heart and soul. He was an instructor until his death. He would take a kid aside and work with him, whether it was because of a learning disability of because the kid needed to change his attitude a little. Dad always felt that the hunter safety law was the one piece of legislation that he sponsored that did some good," Dave recalled.

What is it that these volunteers do? Preparation for teaching the course is a major effort for each instructor. The instructors review the "Montana Hunter Education Handbook" to refamiliarize themselves with the its content and with the format of the course. Instructors often use teaching aids such as firearms demonstrations, movies, slide shows, and "outside" experts such as biologists to better project the information. Also, the instructor may ask others to critique the class so he or she can improve any weak areas.

During the class, instructors continually evaluate each student to determine if the youth is mature enough and responsible enough to handle firearms. This evaluation is more important than whether the student can successfully pass the final written test. If the instructor feels the student is not mature or responsible enough, the student may not receive the certification, even if he or she successfully completes the examination. The instructors must ask themselves if they would feel comfortable hunting with each of the students. If there is doubt, the instructor consults the parents and the student is asked to re-take the course with the idea that time will help mature the individual.

Instructors can be proud of the excellent results their educational efforts have created. Hunting accidents involving injuries and deaths have dropped from an average of 23 accidents a year to an average of 11 per year in the last 20 years. Statistics about hunting-related accidents are used in the hunter education course. Practically every accident could be prevented if three simple rules of gun handling were followed by all hunters and shooters:

1. Treat every gun as if it were loaded.

2. Always point the muzzle in a safe direction.

3. Be sure of your target...and beyond!

Think about it. If these three rules were followed by all who handle firearms, *accidental shootings and injuries would not occur.*

Many civic organizations become involved in the Hunter Education Program. They do so when their members volunteer to become instructors, or when they offer space for classes, or contribute money so more or better teaching aids can be acquired. To name a few, these organizations include local schools, Optimist Clubs, Montana Safari Club, Jaycees, Montana Bowhunters Association, Kiwanis Clubs, and local rod and gun clubs.

Manufacturers and retailers of hunting, shooting, and outdoors equipment contribute items to be awarded to the instructors at training workshops. Such contributions are one of the ways these businesses and the Department of Fish, Wildlife and Parks can show appreciation for the hard work and long hours the instructors donate. They know that Montana's volunteer instructors are helping to make shooting and hunting safer for all and they are willing to show their support.

The Department of Fish, Wildlife and Parks, as the administrator of Montana's Hunter Education Program, knows the value of these volunteer instructors. Help us thank these dedicated friends. Give the instructors in your area a pat on the back, a handshake, or let them know, in some other way, that what they do is sincerely appreciated. ■

MANDIBLES continued from page 17

and has no refuge from *Mysis*, which may have led to its demise.

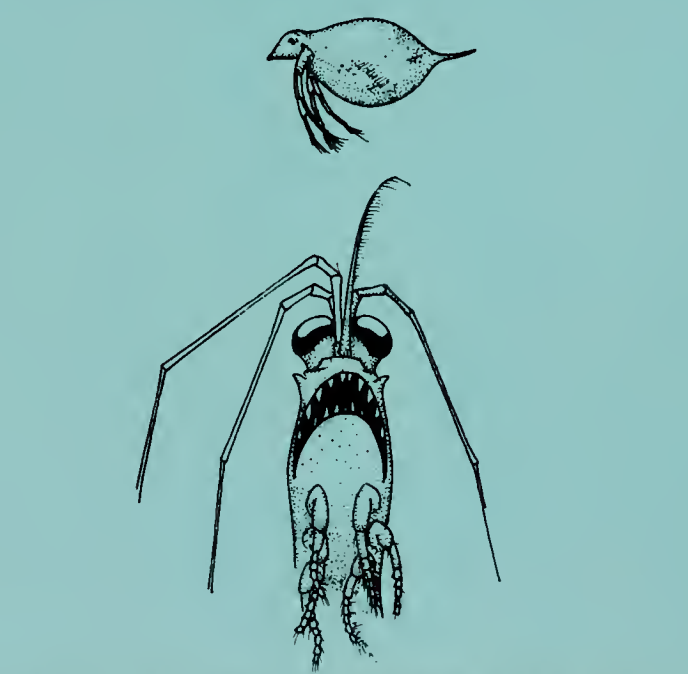
DFWP biologists have been taking zooplankton samples in other parts of the lake. So far, their information on Flathead Lake *Daphnia* shows patterns similar to those discussed above.

Will *Mysis* Affect the Flathead Lake Kokanee Fishery?

So, *Mysis* is beginning to impact *Daphnia* in Flathead Lake. One *Daphnia* species now is present, but only during a limited time of the year. The other species has become extremely rare. How does this translate into effects on kokanee? The kokanee appear to depend on *Daphnia* for food, and *Mysis* appear to be capable of severely reducing that food source.

Even though *Daphnia* is affected now, any effects on kokanee might not be seen for another two to four years. The reason for this is that the very young fry are probably the most seriously affected by *Mysis*. They probably depend more on the slow-swimming *Daphnia* than do older fish. If these young fish don't survive because of an insufficient food supply, the fisherman will not notice it until the older fish die after spawning and no young ones grow to maturity to take their places.

Fisheries management strategies to offset some effects of *Mysis*-induced damage to kokanee food supplies include stocking larger fish later in the season. The idea is to get the young fish through the spring period of *Mysis*-induced food scarcity, and release them after the surface waters have warmed and *Daphnia* populations have developed. This strategy requires the expense of building and maintaining a hatchery and is currently being tried in Lake Pend Oreille in Idaho. Results aren't yet conclusive.



The little creature calmly swimming along at the top of the sketch is a type of zooplankton called *Daphnia*—or water flea. In pursuit is an opossum shrimp, *Mysis relicta*, whose mandibles make quick work of the water flea.

Some biologists believe the young salmon in the Flathead Lake system may spend some of their juvenile life in shallower portions of the lake. *Mysis* numbers tend to be lower in these areas and they may not have as dramatic an effect on the *Daphnia* there. If this is true, the young salmon may fare better in Flathead than in some other lakes. DFWP biologists are studying this more extensively.

Benefits of *Mysis* Establishment

Some fishes will probably benefit from establishment of *Mysis* in Flathead Lake, including cutthroat, bull, and lake trout and lake whitefish.

Studies in Sweden, where *Mysis* have been introduced to about 50 lakes and reservoirs, indicate that total fish production declines in a lake following *Mysis* introduction. Open-water, surface-feeding fishes, such as kokanee, suffer most. However, the Swedes also found that deep- dwelling and feeding fish, such as lake trout and whitefish, usually benefit from *Mysis* introduction. Evidence that these species are feeding extensively on *Mysis* in Flathead Lake is accumulating.

Bull trout feed in deep water, and are likely to benefit from the newly abundant *Mysis* forage in Flathead. However, both large bull and lake trout presently forage extensively on kokanee. If the salmon decline, benefits accrued from *Mysis* as forage may be at least partially offset by loss of kokanee. There is some indication that the numbers of lake trout increased in some similar lakes where *Mysis* had been introduced, but their average size declined. Some fishermen have reported that these smaller, more abundant, lake trout which had apparently fed extensively on *Mysis* tasted better than the larger fish they had previously caught.

Possible Effect on Water Quality

Mysis also may influence water quality in Flathead Lake. Recent research at the FLBS suggests the lake may be at a crucial stage in the eutrophication, or enrichment process, due to human influences (See "Flathead Lake's Midlife Crisis," *Montana Outdoors*, July/August 1986). Alterations in the complex web of interactions between nutrients, fish, zooplankton, and algae in Flathead Lake might well follow establishment of a large *Mysis* population. The scientific literature suggests that *Mysis* may be capable of influencing overall water quality, but in which direction is not at all clear at this point. Researchers at the FLBS are conducting experiments to clarify these issues.

Clearly, *Mysis* is changing the complex web of life in Flathead Lake. *Daphnia* have declined, and the future looks uncertain for kokanee. Still, there are sources of optimism. Flathead Lake is unique and nobody knows exactly what the overall response will be to *Mysis*. If kokanee decline, populations of other fishes better able to feed on *Mysis* may increase.

It looks as though *Mysis relicta*, the opossum shrimp, is here to stay in the Flathead. Like the splash and subsequent ripples formed when a stone is thrown into a pool, *Mysis* has upset the delicate ecological balance of the lake. *Daphnia*, kokanee, whitefish, bull trout, bald eagles, water quality—all will feel the reverberations to some extent. ■

Quarriers of Stone

by Les Davis

As I troweled through the debris about five feet below ground, the floor of the excavation unit collapsed and sank abruptly beneath me. My balance regained and the dust settled, I saw the opening to a once-concealed subterranean cavern. Its far end was in darkness, about 30 feet away back under limestone bedrock. Strewn about the musty interior nearby were twigs, thistles, prickly pear cactus, deer antlers, and pack rat-gnawed animal bones. Some were antler and bone artifacts discarded hundreds of years earlier by prehistoric miners.

I had been working in an open-pit quarry formed by Stone-Age peoples who mined chert, a glassy kind of rock from which they produced tools. Over the centuries, they backfilled most of the open pit with mining debris and artifacts. When deposits inside the newly discovered cavern were excavated and carefully sifted through, we found flaked stone artifacts made from a high-quality chert. The miners had quarried the chert out of this limestone formation where the chert had been formed millions of years ago.

This exploration resulted from an event eight months earlier, in the fall of 1971. Bill Kolokotrones, from Three Forks, called to tell me about a mysterious place near Three Forks he had found when he was a boy riding horseback in the Horseshoe Hills. He had come upon a collection of overgrown oval depressions formed in limestone bedrock. Ridges of limestone rubble surrounded these shallow, overlapping depressions in what was otherwise a smooth, sloping surface. Someone had breached the bedrock, creating a disturbed, undulating landscape. Bill wondered whose activities had altered this nondescript limestone knoll, and why.

By the mid-1930s, he had guessed that this place somehow involved Indians. To learn more, he dug by hand into the rubble where he found pieces of bone, stone flakes, and clam shells. He went back several more times during the 1960s, each time covering his holes. By then, he had decided he had found a "real old Indian work," although what had happened there still eluded him.

In 1969, he again tried to learn more. A construction worker using a front-end loader near the Missouri headwaters drove to that place and opened up the ground, with shallow cuts toward the south, west, and east. Amidst the rubble thus overturned, Bill saw more bone splinters, flakes, and clam shells that supported his belief that this indeed was an old Indian campsite of some kind. But the blackened rubble also looked a lot like slag or waste debris found around old historic mines!

Late in 1971, Bill called the place to my attention and to that of Les Drew, then director of the Museum of the Rockies. While walking across the overturned blackened debris during our visit, I, too, saw splintered animal bones, clam shell

MSU PHOTO

Chert from the Schmitt mine varies widely in color, internal structure, and texture.

fragments, and flakes of chert and obsidian, the latter a black volcanic natural glass. (I later learned manganese that had accumulated naturally inside the limestone formation had contributed to the blackened effect.)

During spring quarter of 1972, I led students enrolled in my advanced archaeology course at Montana State University to that place, resolved to learn once and for all what the attraction had been. At that time, I suspected that the site was a quarry of some kind. By then, though, I had visited only a few prehistoric quarries in the Northwestern Plains and Rockies. Most appeared as pitted flats or sidehills where prehistoric peoples had extracted and acquired quantities of chert, quartzite, or obsidian for later toolmaking at nearby workshops. However, that some ingenious prehistoric people obtained quality chert by mining deep, underground formations came as news to me.

Discovery of the underground "cave" and numerous bone, antler, and stone artifacts in 1972 clearly revealed why humans had been persistently active at that place. Some of the bone and antler tools were used to force their way downward and into the chert-bearing limestone bedrock. In that way, they obtained high-quality, unweathered chert that had formed therein as a result of complex geological processes. The remarkably well-preserved antler and bone tools still display marks from abrasion caused when they were used to dislodge coral-like limestone masses. Early miners used such implements to pry, wedge, spread, loosen, and free bodies of chert encased in limestone. Tools produced from this chert not intended for use in mining, such as stone projectile points hafted to spearthrower darts (atlatls), hide scrapers, and knives, are common in the mine backfill.

The open pit that formed from the laborious breakage and displacement of tons of bedrock and removal of chert over many centuries had been largely backfilled with debris. Although that fact might at first appear to be an early example of prehistoric "reclamation," it was simply the most labor-saving way of disposing of chert-free tailings and clearing the way to continue mining without obstruction.

From at least 11,500 years ago until the arrival of the Lewis and Clark Expedition in the Three Forks area in 1805, locally adapted bands of seasonally nomadic hunter-gatherers exploited mineral, animal, and vegetal resources of what is today the Treasure State. In the Schmitt site area, the seasonal abundance, widespread distribution, and accessibility of life-supporting resources enabled both year-round and periodic human occupation. Some landscapes of early Montana were especially inviting to Stone-Age peoples because they presented great quantities of flakeable stone, particularly in the Northern Rockies and at some locations on the High Plains.

These early Montanans satisfied their basically similar resource needs in distinctive ways, such that the different cultures varied mainly in detail from one to the next. All were Stone-Age peoples who *collected* rather than produced their food. They hunted and gathered food as needed and, in the process, used stone, bone, antler, shell, wood, and other raw materials for toolmaking and myriad tasks. In terms of economic and sociopolitical complexity, they lived as bands, the members linked to each other through kinship and marriage.

These adroit hunter-gatherers hunted bison, pronghorn, bighorn sheep, wapiti, deer, and lesser game species in the mountains, along rivers and in their valleys, as well as on the game-rich plains. Discarded bones and antlers of these food species are abundant in the open-pit mine fill at the Schmitt site. Because these species shifted range seasonally, hunter-gatherers moved from time to time to stay within hunting range. They also had to regularly visit locations where seasonally available edible roots, berries, and other vegetables and fruits grew, where there were lodgepole pine forests for tipi poles, and where preferred stone could be obtained to satisfy tool needs. People thus planned and scheduled travel, camping, and food collection before going into winter camp.

The ability to replenish dwindling supplies of stone was basic to survival. Quarries generally similar to most of those at the Schmitt site are widely distributed in mountainous west central and southwestern Montana. Although some superficially resemble abandoned, historic prospect pits or shallow mines, they are prehistoric in origin and age. Some cover hundreds of acres of forested sidehills and slopes. Quarry features often look different from the surrounding landscape, marked as they are by symmetrical oval depressions with semicircular mounds of removed limestone rubble downslope. Greater amounts of moisture captured in the interior basins support more lush vegetation, contrasting sharply with less well-watered growth nearby. Pronounced differences in relief and density of vegetative cover help archaeologists detect quarried areas on the ground and during aerial surveys for prehistoric sites.

Archaeologists know remarkably little about early peoples' knowledge of geology, their "engineering" abilities, and their mining strategies and techniques. Did quarrying activity vary in intensity over time at different quarries? Why were some bedrock outcrops of quality stone relentlessly quarried while others, that seem to us of equal quality and just as accessible, were lightly used, or not used at all? We have developed limited insight into decision making by prehistoric stone workers ("flintknappers"). Why did they develop preferences for some kinds of stone and not others? When was obtaining stone more trouble than it was worth? Were they really concerned about matters such as efficiency?

Over the past 14 years, I have directed multidisciplinary investigations of the open-pit chert mine at the Schmitt site. During the last two weeks of spring quarter, students and I are permitted to excavate at the site by the Floyd Schmitt family from Willow Creek, Mont. The Schmitts own the property on which the Three Waters Quarries are located. They permit the university access to the site each year for instruction and research programs. Their selfless generosity and interest in learning about the "old days" in the Missouri Headwaters are very much appreciated.

Radiocarbon dates obtained by analysis of charcoal from the mine fill have established that chert was mined here from about 1400 to 200 B.C. Since local climate during the quarrying era was similar to today's, mining might have gone on even during some mild winters. That area is often free of snow in winter and is ordinarily warmer and drier than surrounding mountainous areas where abundant chert was exposed, but snow-covered, frozen, and inaccessible during

Montana State University students re-enacted chert extraction and tool production activities inside the Schmitt mine for "The Changing Dawn," a film sponsored by the Montana Bicentennial Administration.
MSU PHOTO

winter.

Prehistoric peoples in the region might have had to replenish their chert supplies more than once a year through visits to this or other quarries. Chert was extracted by hand, requiring considerable energy outlay. Just feeding a hundred or more people for several weeks at the quarries would have required a well-defined division of labor. Family-band groups carried chert with them when they moved into camps along wooded river bottoms for the winter.

Peoples who worked the mine shared a common technology. Members of perhaps 30 generations of related Stone-Age peoples used the Schmitt chert mine, but they also relied on other chert sources elsewhere in their territory. Could they have controlled access to the Schmitt mine and chert supplies? That would explain the persistent presence of but a single technological tradition. But, assuming that other peoples demanded access to that chert, could mine users have prevented them from doing so? It seems doubtful they could have even maintained a year-round presence there, let alone defended the mine against incursions by others. Just providing food to support such a sizable group camped there would have exhausted local game resources in no time at all. Continuing excavations at the Schmitt mine and ongoing research may suggest reasonable answers to these and other intriguing questions.

Peoples who mined Schmitt chert were part of a widespread, regional network of hunter-gatherers who used the atlatl. The first people equipped with bows and arrows arrived in this area a few centuries after the open-pit mine was abandoned. Hafted to each dart was a corner-notched stone projectile point (Fig. 1n). These "Pelican Lake" points were named as a historical type at the prehistoric Mortlach occupation site in Saskatchewan where they were found and described in the mid-1950s. Since then, Pelican Lake sites have been found in all Canadian prairie provinces, on the plains of Montana, Wyoming, North and South Dakota, and Nebraska, and in the mountains of British Columbia, Alberta, Montana, Wyoming, and possibly Colorado. Pelican Lake sites thus far investigated are predominantly bison kills and campsites. The Three Waters Quarries—comprised of the open-pit Schmitt mine, three separate shallow-pit quarries, two prospect pits, four dispersed tipi rings, and two campsite/workshop areas—is the only Pelican Lake Complex chert source area being studied persistently in detail.

Organic artifacts from the Schmitt mine are well-preserved and diverse in form and function. Most numerous are bones, antlers, and teeth of game animals used for food. Some of the discarded parts later served as tools (Figs. 1a-g, j-m). Most of the bones and antlers used, discarded, worn out, or left in the mine probably were brought there from the campsite to the north. Some may have been scavenged from carcasses of winter-killed animals in the vicinity. Bison, wapiti, white-tailed and mule deer, bighorn sheep, and pronghorn were used for food. Ground squirrels, domestic dogs, skunks, jackrabbits, cottontail rabbits, beavers, and painted turtles were also used for one purpose or another. All except bison inhabit the area today. Bones of reptiles, amphibians, and small mammals in the mine fill represent species that lived and hibernated inside the limestone fractures and backfill piles. A moderate number of freshwater clam shells, the meat probably consumed by miners, have been recovered; few show evidence of use as artifacts.

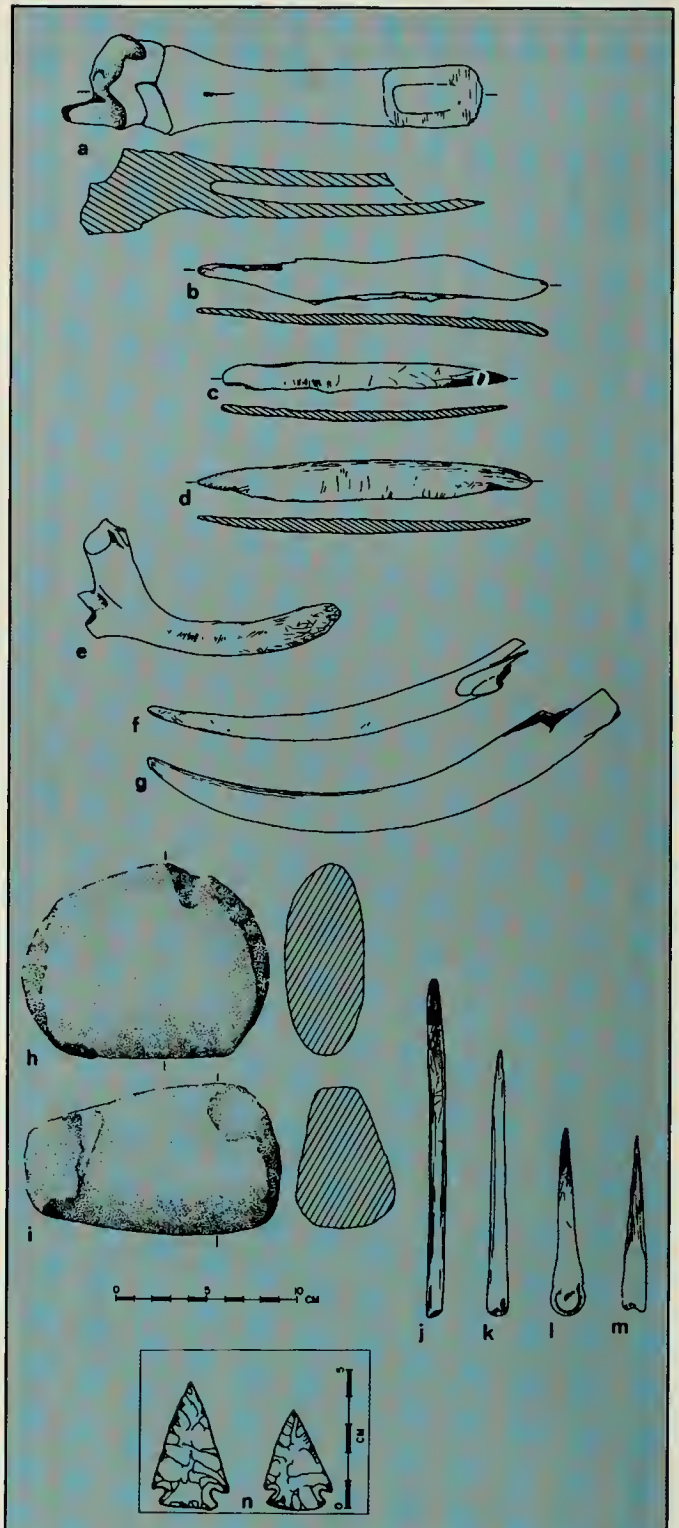


Fig. 1—Bone, antler, and stone artifacts from the Schmitt chert mine: (a) bison metapodial hide flesher with serrated forward edge; (b) bipointed compact bone pick; (c) split rib pry; (d) bipointed split rib pry; (e) rib end pick; (f) and (g) deer antler knapping tools; (h) and (i) cobble hammers with bipolar, percussion-spalled ends; (j) cylindrical bone pick; (k), (l), and (m) compact bone and metapodial perforators; (n) Pelican Lake atlatl dart projectile points made from Schmitt chert.

People did much more than mine inside the open pit, as suggested by some of the bone, antler, and stone tools. Most bone tools consist of split rib ends used to widen sediment-filled limestone fractures, freeing lodged chert masses. Intentionally modified long, narrow portions of mammal leg bones and wapiti and deer antlers were used for more demanding mining tasks. Some wapiti antlers were used as hammers to modify the raw chert into a form so that deer antlers could be used to form desired stone tools. Non-mining bone tools include split leg bone perforators and awls used to pierce and lace green or dried animal hides to make skin containers for transporting raw chert to the nearby campsite.

The presence of certain bone tools inside the mine is puzzling because they are thought to be women's tools used at campsites. Perhaps some women occasionally used the open pit to escape cold winds and bad weather and did some of their work there. The deeper underground features could have provided shelter or windbreak. The small amounts of charcoal recovered from the mine fill indicate that fire had not been used extensively for personal warming.

Flaked stone artifacts recovered from the 160-acre campsite/workshop north of the mine duplicate stone tools recovered from the mine. However, bone and antler artifacts once probably used there have long since deteriorated. Many broken, fire-reddened rocks from prehistoric fire hearths are turned up annually when these fields are cultivated and seeded. This north campsite/workshop area was once occupied by people who worked the mine and two other quarries, upslope to the north.

The limestone bedrock had locally been fractured and fragmented by geologic folding and compression many years earlier, making it possible for miners to get to and extract underground chert using hand tools. These softened fissures had accumulated numerous fist-sized and larger river cobbles when water from the Three Forks Basin overflowed across that permeable limestone surface somewhat later. That overflow also dumped sand, gravel, and stones before the Missouri River Canyon was incised. Miners collected hundreds of these conveniently hammer-shaped stones (Figs. 1h-i) as they mined along chert fissures, using them to pulverize impeding bedrock. In modern parlance, this ancient mining strategy is called "gophering."

Pelican Lake chert miners extracted unknowable quantities of chert from the open pit, possibly more than needed for their own immediate and deferred needs. Some chert may have been traded for valued commodities that originated from distant areas. Stone tools and waste flakes of quartzite, basalt, obsidian, porcellanite, and chalcedony, none of them native to the Madison Formation, have been recovered from mine backfill. Such "exotic" stone types were brought here from northwestern Wyoming, southeastern Idaho, eastern Montana, and as far away as western North Dakota. Beads fashioned from shells of marine snails native to the Pacific Coast that were found in the mine may have been obtained in exchange for Schmitt chert. Or, peoples from the Pelican Lake Complex may have acquired exotic materials by trade or exchange somewhere else inside their territory, taking them later to the Schmitt mine. Whatever was the case, these wide-ranging hunter-gatherers engaged in economic transactions that extended well beyond the Three Forks Basin of early southwestern Montana.

While most of the activity at the Schmitt mine was men's work, dominated by chert mining, some of the recovered artifacts reflect more aesthetic, spiritual, ritual, and artistic aspects of life. Clam shell, snail shell, steatite (soapstone), and a mammal incisor were perforated and made into "combs" and beads for use in bodily adornment, games, or rituals. These small, delicate objects, however, comprise only a tiny fraction of artifacts from the mine. Other natural substances probably used, such as wood, hides, sinew, and vegetal materials (except for wood charcoal from sagebrush and juniper trees), have not survived in the archaeological record. Naturally occurring red ochre (iron oxide or hematite) in the southwestern part of the mine may have been particularly sought after for ritual use and also as a highly desirable and therefore valuable trade item.

Persistent studies at the Schmitt site have raised some new and intriguing questions. Extensive use of the Three Waters Quarries shows that early people depended on siliceous minerals for toolmaking. The possible secondary role of these minerals as valued trade items raises still other questions. Quarries such as these are comparable in scale and energy invested to some of the more visible residential and ceremonial structures constructed elsewhere in the Americas by cultures far more technologically and culturally advanced than our local hunter-gatherers. Only some tipi ring habitation and bison kill sites—the latter with associated gathering basins, drive lines, and drive lanes—rival the scope of prehistoric, large-scale quarry sites in Montana.

About 900 MSU students have studied, worked, and thought about life at the Schmitt mine during the past 14 years, under professional direction and supervision. These ongoing, hands-on efforts, coupled with research findings developed by cooperating scientists, are providing new and tantalizing insights into significant moments in Montana prehistory.

Regional archaeologists and public and private historic preservationists are becoming increasingly aware of the fundamental importance of understanding these distinctive, large-scale sites. Research at the Schmitt site is inspiring better-informed ways of studying quarries as productive storehouses of significant information, the persistent study of which is shedding brighter light on the essential roles that mineral resources played in supporting Montana's first pioneers and residents. ■

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Beav

The beaver (*Castor canadensis*), one of 101 mammals in Montana, is the largest rodent north of Panama. Adults can weigh more than 60 pounds. Adapted to live in an aquatic habitat, the beaver's limbs are modified for swimming; the hind feet have a web of skin between the digits that provides more surface area to push against the water.

Each of the feet have five digits. The claws of the second and third digits of both hind feet are divided and are used in grooming. The broad, flat, scaly tail is perhaps the beaver's most obvious identifying characteristic. The coat consists of unusually dense, fine underfur, but this is overlain with longer, coarse guard hairs. The beaver's head and back are a rich glossy brown, but color varies with season and location. The belly and chest are light brown to tawny, while the tail and feet are black.

Beavers have 20 teeth; the incisors, adapted for gnawing, grow about an inch a month. This tooth growth is necessary in obtaining food, since constant gnawing on the bark and cambium of willows, alders, birches, and aspens —their favorite food—wears down their teeth. When the beaver fells a large tree, sometimes a foot or more in diameter, it will be "cut" into sections that can be more easily handled. In some cases, when the food source is a considerable distance from their lodge, beavers construct an elaborate system of canals so they can safely travel by water and more easily transport their food. Because beavers do not hibernate, they can secure food all winter if weather conditions are favorable.

Beavers prepare for harsh winter conditions by taking branches into the deeper part of a pond and anchoring them to the pond bottom, thus forming a "cache." This food source will be used over the long winter.

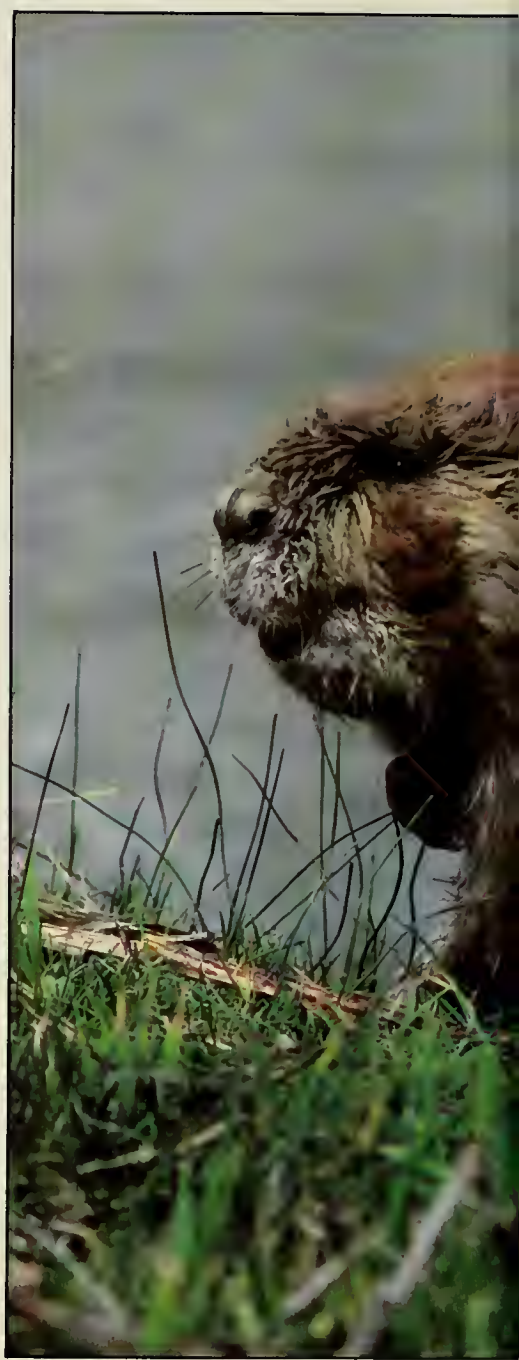
Some beavers construct and live in dome-shaped lodges made of sticks and mud. These usually have two entrances underwater below the ice line. If it is a cold winter and the body of water freezes, the cache provides an easily available food source. Lodges vary in size from a few feet high to massive structures. A lodge may be used year after year by the same family, and in the normal course of housekeeping, the beavers continue to add to their house.

Beavers may also live in a den in the bank of a stream or river, in which case the bank den serves the purpose of the lodge. Although some people believe that bank and lodge beavers are different species, this is simply an illustration of how animals can adapt to different environments.

Beavers are continually constructing dams to create ponds for their security and a place for a lodge. On large rivers and streams, they can't maintain a permanent structure because of runoff that tends to occur each spring. Dams, constructed of sticks, mud, and rocks, are easily washed out by high water. On smaller streams, however, the dams create ponds that act as impoundments to control runoff. Sediment accumulating in a pond eventually forces the beaver colony to move, since the pond becomes a bog having inadequate standing water to provide security. As more and more vegetation grows, the former pond may eventually become a meadow.

The beaver's gestation period varies from 42 to 128 days. Most authorities agree, however, that young beavers are born in April or May after a gestation period of three months. Litter size ranges from two to eight kits (usually four). The kits remain with their mother throughout the first year. In most populations, sexual maturity is not reached until 2-1/2 years. At this time, the young are no longer tolerated by the adults, so they are forced to seek a place to live on their own. They will set off upstream or downstream in search of a home and, in some cases, they will cross land for short distances to reach new bodies of water. No matter what the direction of travel, their newly found area must have the essentials for life—food, water, and a place to construct a shelter.

Because the beaver is classified as a furbearer in Montana, there is a season, bag limit, and license requirement for trapping. The season usually opens in November and runs through March or April, depending on regional regulations of the Montana Department of Fish, Wildlife and Parks. After the trapper catches a beaver, he skins, dries, and stretches the hide. Beavers are difficult to skin because large quantities of fat accumulate under their skin. All fat deposits should be removed to prevent "slippage"—a condition in which the hair slips from the hide,



ers—Big and Busy

by Vince Yannone

HARRY ENGELS

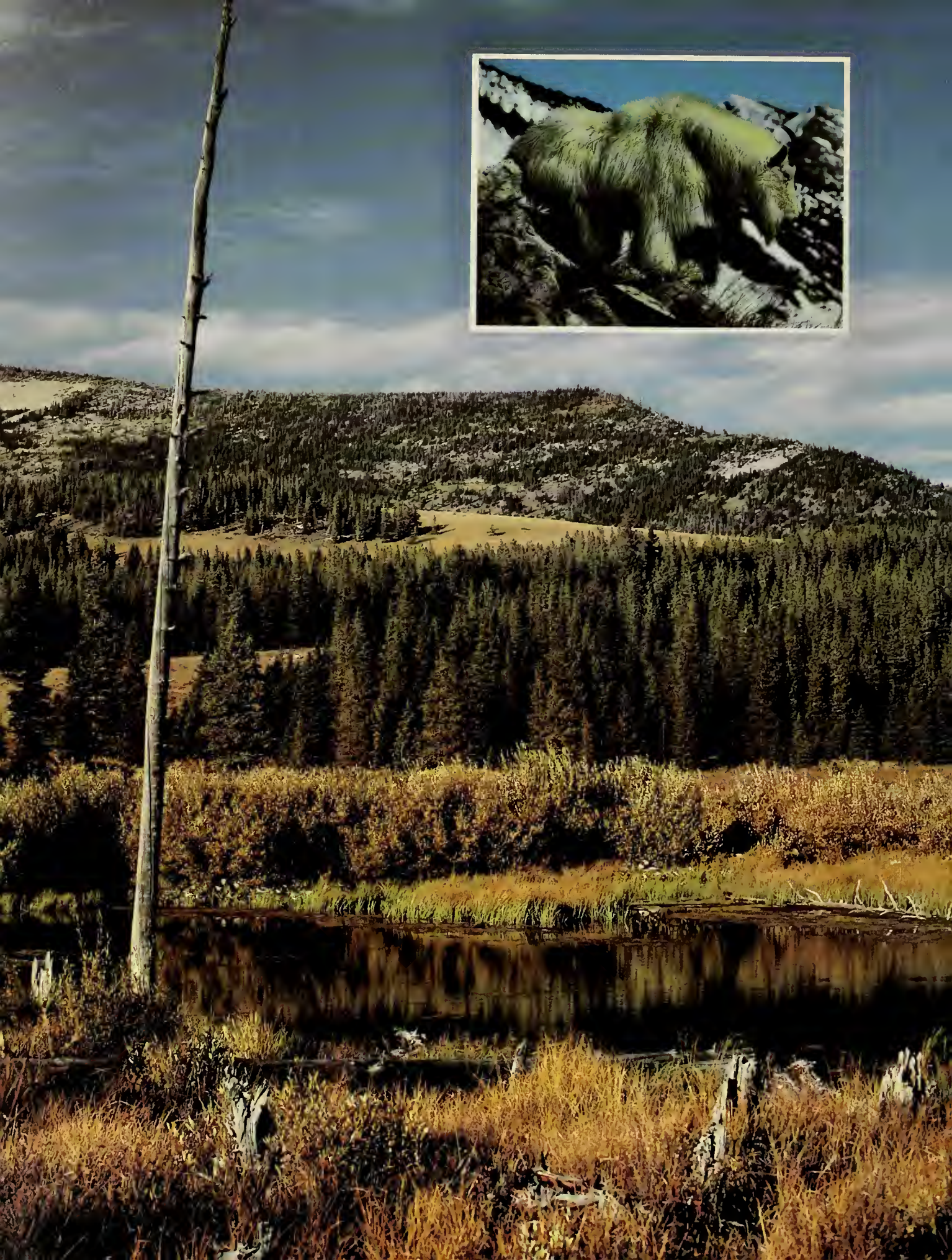
creating a bald spot. If this happens, the skin loses its value. A properly cared for skin—called a "blanket"—may bring from $10 to $35 at current prices, depending on the size, color, and fur condition.

Farmers and ranchers sometimes experience problems with irrigation canals and culverts being plugged by beavers working in the area. The blockage can be removed today, and tomorrow it will be back. It seems the beaver, to maintain the water level it wants, will work overtime to obstruct the canal or culvert you just cleaned. This no doubt gave rise to the expression, "He (or she) works like a busy little beaver."

Small streams are frequently plugged by beaver dams. In some cases, this may cause problems, but in the overall scheme of nature, these dams on small streams create habitat for other aquatic animals and help control runoff. They also help in providing a water supply for domestic and wild animals during dry years. ■

HARRY ENGELS

The beaver's trademark--an earth-and-stick dam across a small stream--creates an impoundment where the beaver can build its lodge. The bark and cambium of willow, alder, birch, and aspen are among this big rodent's favorite foods.



Goats, Curly Bear, and Common Sense

by Gary Olson

The Badger-Two Medicine area (left and above), just southeast of Glacier National Park, is one of Montana's premier wildlife areas—and also a hot spot for potential oil and gas exploration. Counting mountain goats was the primary reason for the author's arduous trek up Curly Bear Mountain (photos: Gary Olson).

I could just about hear Johnny Cash singing, "How high's the water, Mama?" Cranking a dead bike was not my idea of a fun Monday, but things could have been worse. It's interesting how we always blame things on a certain day of the week. My partner had suggested minutes earlier that this might not be the best day (or month) to attempt a motorbike crossing of Badger Creek. As he siphoned water out of his gas tank, I knew he had been right. But neither of us had been convinced enough to bring along a change of clothes.

Normal snow melt and rain showers had swelled "Main Badger," as we called it. Miles of upstream tributaries emptying water from the east slopes of the Continental Divide into the north and south forks of Badger Creek didn't hurt the cause either. Mondays and melting drifts of snow definitely had contributed to our questionable view of this otherwise scenic landscape.

Goats were also on my hit list. If it weren't for them, we wouldn't have ventured into Badger Canyon to begin with. Weeks in advance, we had pondered about transportation into the area. Fifteen miles on foot is nothing to sneeze at, and horses tend to get nervous in the hills at night, which gives them a further tendency to seek safety 15 miles away back at the truck and trailer while you sleep. Trail bikes were the solution: quick, efficient, and trouble free. I can remember my partner emphasizing "trouble free"; I was hung up on "quick."

Goats were reported on Curly Bear Mountain during the early spring season, presumably finding some salt licks (mineral deposits) to their liking. The idea was to find the lick and wait for various groups of goats to wander in and out while we counted the adults, yearlings, and kids. Ideally, goat counting is best done from the air, but with diminishing funds for aircraft use, we thought it might be interesting to set up yearly counting areas on the ground to get an idea of annual kid production and other information.

Curly Bear Mountain lies several miles upstream from the "Main Badger" crossing, on the South Fork of Badger Creek. It's one of those sleepy looking formations with lots of timber around the base to disguise numerous rock outcrops and other assorted and difficult-to-climb surprises. Access to the mountain via the South Fork trail involves two more stream crossings, neither considered "user friendly."

The Badger-Two Medicine country (so named because of the two major watersheds that drain it) is much less rugged than Glacier National Park, immediately to the northwest. It's almost like the Creator took a breather from the hard work of mountain-building and decided on something a bit less difficult. Ironically, as you travel south, the topography again becomes jagged and harsh along the East Front and Bob Marshall Wilderness.

We were lucky to find a recently used goat trail which crossed the main trail. We parked the bikes here and began the ascent of Curly Bear on foot. Goat trails aren't really different from any other game trail, except in spring, goats lose large amounts of winter hair while they move from mountain to mountain. Bushes, branches, and stumps collect wads of the fine, white hair, which closely resembles sheep's wool. Often, goat paths are quite clearly marked with shed hair; we call it "Hansel and Gretel tactics."

Maybe goat trails *are* just a bit different. For example, a goat obviously knows that the shortest distance between two points is a straight line;

straight lines equate to a lot of up and down for goats and those who follow them around. While climbing up our newly found trail, it amazed me that rocks and soil can perch on such steep slopes and not fall off. Our snorkeling lesson in Badger Creek earlier that morning didn't seem so bad, now that the conversation had turned to mountain climbing accidents.

The trail wound up the base of Curly Bear Mountain at an alarming angle; no longer did it seem passive or benign. Huge boulders that appeared temporary to the slope rested gingerly on talus. Here we spotted a nanny and a newly born kid picking their way across the rock field. The sure-footedness of goats has to be seen to be appreciated. Their apparent lack of concern for high, rough places is accented by the masterful look they have when surveying the surrounding area from atop some remote lookout. She and the baby watched as we moved within binocular range and then slowly made their way over a rock cornice and out of sight.

Within 15 minutes, we were watching 34 goats of various ages in a small, eroded basin of exposed shale. Some of them rolled in dust beds, trying to shed parts of their woolly coats. Others were lying contentedly in shallow day beds they had pawed out of the loose black shale. Still others were licking at the ground around numerous springs that

MIKE LOGAN

Goat kids act like human kids at play—lots of jumping and running, bouts of fierce combat, and constant aggravation to any adult who happens to be around.

oozed out of the slope. The most entertaining sight of the day was a 20-minute play session between two newborn kids. Basically, goat kids act like human kids at play—lots of jumping and running, bouts of fierce combat, and constant aggravation to any adult who happens to be around.

Throughout the afternoon, various groups of goats came and went, always cautious and watchful. The route into the lick was along a precipitous ledge that eventually worked its way down into the basin. Again, we marveled at the goat's ability—even when a few weeks old—to master this moonscape terrain. The anatomy of the mountain goat is adapted to the alpine environment, however. Each hoof comes equipped with a small cup or indentation on the bottom. These cups provide maximum traction and grip. Massive muscles in the shoulder area aid in the constant climbing the animal must do to survive.

We saw more goats lying on huge snow cornices that had accumulated the previous winter. Flies and other insects must plague goats as much as other wild animals at this time of year, and what a way to cool off! Since two of the nannies had not yet begun to shed, they were sprawled on the snowbank like white bear rugs, taking full advantage of the cool surface.

Loss of winter hair begins on the head, moves along the neck and withers, and then down along the legs to the back of the rump. Males normally shed earlier than females, with the entire process taking a couple of months (from mid-May to mid-July). The summer coat appears just in time for the goat to begin growing another winter layer. The belief that goats are "dirty" in the summer is simply because of the rolling and rubbing that accompanies shedding.

The summit of Curly Bear seemed to motion to us as we continued upslope. After another hour of negotiating boulders and cliffs, we knew the effort was worth it. A well-used trail followed a lower ridge to the summit and then beyond to Spotted Eagle Mountain, which from what I could see was basically another peak in the same complex. The lofty majesty of Glacier Park stood out defiantly against the blue June sky as we gazed to the north. The peaks of Glacier could be defined only by the cotton fluffiness of cumulus clouds suspended above them. The South Fork of Two Medicine River drains through a broad, timbered valley toward U.S. Highway 2 and Glacier Park; Badger Creek runs eastward to the Blackfeet Indian Reservation. Through a frame of green boughs and purple velvet cones of subalpine fir, we could view portions of the Continental Divide and the Bob Marshall Wilderness to the south and west.

A swig of water from our canteen, a Snickers candy bar, and the vast expanse of country below prompted some philosophy about the future of this wild land. Since the area is not included in either the Great Bear or Bob Marshall wildernesses, oil and gas exploration, grazing, timber harvest, and various forms of motorized recreation all occur, or have the potential to occur. In addition, Blackfeet treaty rights have been interpreted by some to mean that the Blackfeet have an interest in the timber, wildlife, grazing, and minerals that the Badger-Two Medicine has to offer. Wilderness advocates feel very strongly the area should be included in the state's wilderness system; minerals specialists claim the Overthrust Belt has great potential for hydrocarbon development, and that this area appears ripe for potential discoveries. Both American Petrofina and Chevron have applied to the Bureau of Land Management and the U.S. Forest Service for a permit to drill in the area. Chevron's preferred site was directly across the valley from us on Goat Mountain. In addition, extensive helicopter-assisted seismic testing has occurred periodically in the Badger-Two Medicine country over the past five years.

Off-road enthusiasts have pointed to the area as one of the few areas in this part of Montana in which they can still bike and snowmobile. Local snowmobile clubs use U.S. Forest Service trails up the Medicine and Badger Creek drainages during the winter months. Trails bikers use the same trails during the summer. Outfitters, hunters, fishermen, backcountry hikers, and horsemen all recreate here.

Cattle graze both the Badger and Two Medicine drainages, and a timber harvest was planned and then deleted from the Lewis and Clark Forest Plan. Small timber sales of logs for posts, poles or house logs would still be permissible under the current plan, as would logging due to insect infestations.

From the standpoint of wildlife habitat, one would be hard pressed to find a stretch of country offering more: Elk, goats, grizzlies, black bears, moose, mule and white-tailed deer, grouse, lynx, bobcats, coyotes, wolves, and mountain lions all make their home here. The list goes on and on. Diverse terrain and abundant vegetation contribute heavily to the overall high quality of the area. A fringe of aspen accents open grassy parks, before yielding to heavy conifer. Along the valley bottoms, spruce and willow bogs and frequent beaver dams create excellent moose habitat. At higher elevations, barren slopes are dotted with subalpine fir and spruce that survived turn-of-the-century burns. Acres of ageless, grey snags and the associated understory of shrubs and young conifers are evidence of the process of plant succession.

It's a classic example of "How much is enough?" management. No one truly knows what the cumulative effects of resource development, recreation, and other kinds of man-caused activities are in time and space on wildlife, such as the mountain goat. Land and wildlife management agencies are struggling to find the answers to these kinds of questions before it's too late. Some believe the Badger-Two Medicine is a critical link between Glacier National Park and the Bob Marshall Wilderness, and to create resource conflicts here would endanger the integrity of both ecosystems.

It's hard to judge what will happen in the Badger Two-Medicine. Certainly, it's one of the premier wildlife areas in the state. It's also a hot spot for potential oil and gas exploration, as well as claims by the Blackfeet. The jurisdictional overlap and stratification here is mind boggling; the final outcome may be years away and of a judicial nature.

We had mixed feelings of optimism and regret when we departed from the summit of Curly Bear on that late afternoon in June. Somehow the treacherous creek crossings, cranky trail bikes, sore muscles, and mountain hazards seemed inconsequential in comparison with the magnitude of the resource conflicts that loom. Unraveling the intricate pattern of the various resources and resource uses to the satisfaction of all interested parties will be impossible without communication, cooperation, and—above all—common sense. The goats on Curly Bear will certainly appreciate the effort.■

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